ORDER NO. SD83072588C8

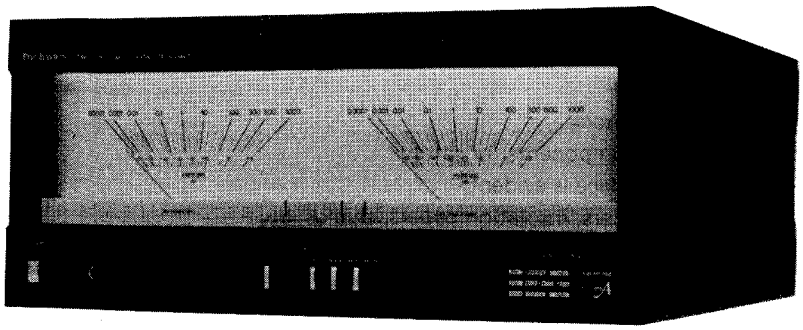
Service Manual

ComputerDrive new class A

Stereo DC Power Amplifier

SE-A3MK2

[D], [EW], [EK], [EF], [EH], [EB], [Ei], [XA]



Areas

* [D] is available in Scandinavia and European except Switzerland.
* [EW] is available in Switzerland.
* [EK] is available in United Kingdom.
* [EF] is available in France.
* [EH] is available in Holland.
* [EB] is available in Belgium.
* [Ei] is available in Italy.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.

Specifications (Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ AMPLIFIER SECTION

20 Hz~20 kHz continuous power output	
both channels driven	2 × 300W (4Ω)
	2 × 300W (8Ω)
40 Hz~16 kHz continuous power output	
both channels driven	2 × 300W (4Ω)
	2 × 300W (8Ω)
1 kHz continuous power output	
both channels driven	2 × 320W (4Ω)
	2 × 320W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.003% (4Ω)
	0.002% (8Ω)
rated power at 40 Hz~16 kHz	0.003% (4Ω)
	0.002% (8Ω)
rated power at 1 kHz	0.0005% (4Ω)
	0.0003% (8Ω)
−26 dB power at 1 kHz	0.0003% (4Ω)
50 mW power at 1 kHz	0.0003% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.001%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.001%
TIM (Transient Intermodulation Distortion)	unmeasurably small
Power bandwidth	
both channels driven, −3 dB (T.H.D. 0.01%)	
	5 Hz~70 kHz (4Ω)
	5 Hz~90 kHz (8Ω)
Residual hum and noise	0.15 mV
Damping factor	100 (4Ω), 200 (8Ω)
Input sensitivity and impedance	1 V/47kΩ
S/N rated power (4Ω)	120 dB (IHF, A: 125 dB)
Frequency response	20 Hz~20 kHz, +0 dB, −0.1 dB
	DC~200 kHz, −3 dB
Headphones output level and impedance	1.1V/330Ω
Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω
Meter	
reading range	0.0001 W~1000 W (8Ω)
	−60 dB~+5 dB
	(logarithmic compression)
frequency response (reading accuracy)	
	10 Hz~20 kHz ±1 dB (more than −40 dB)
	10 Hz~10 kHz ±1 dB (less than −40 dB)
attack time	50 μsec.
recovery time	750 msec. (0 dB~−20 dB)

■ GENERAL

Power consumption	1700W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 208 × 507 mm
	(16-15/16" × 8-3/16" × 19-31/32")
Weight	39 kg
	(86 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SE-A3MK2

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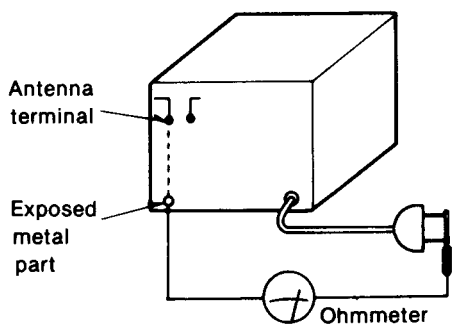
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

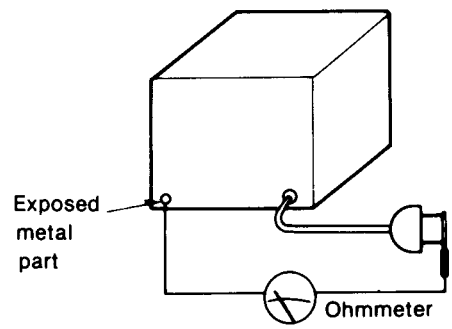
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

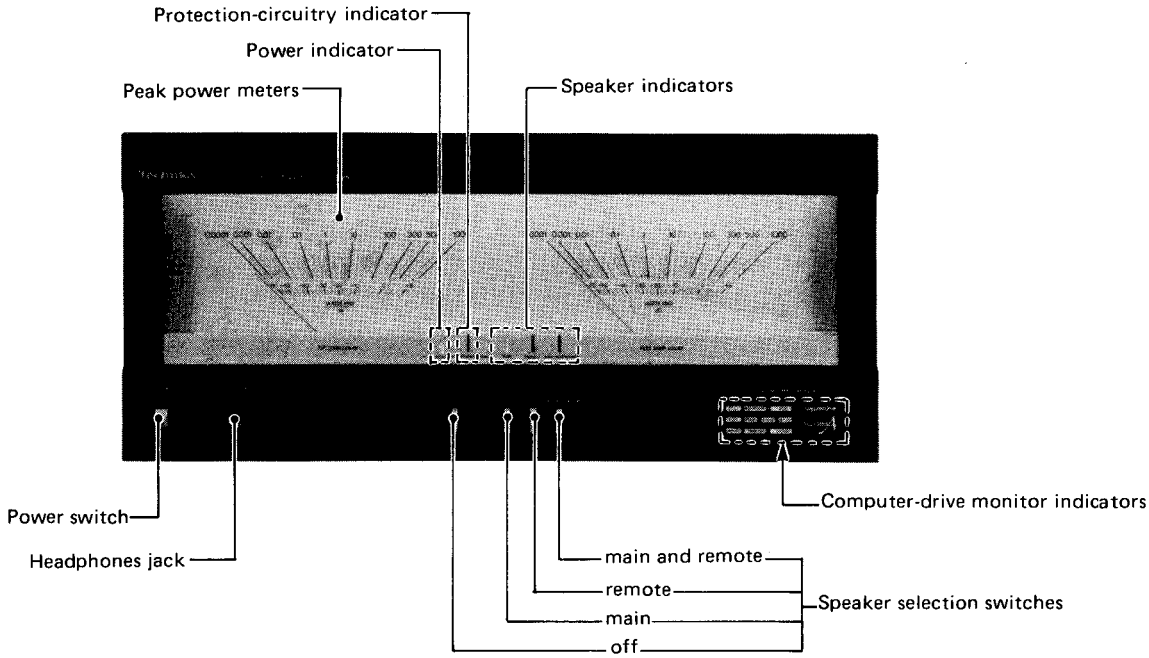
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

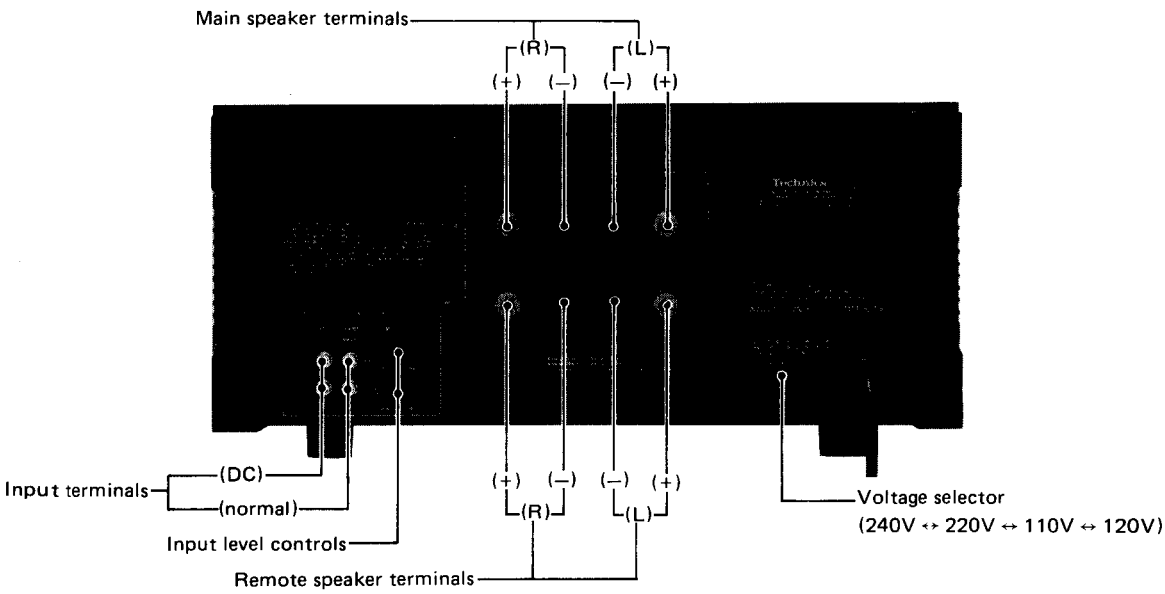
■ BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power supply and short-circuit of power supply capacitors (C1 ~ C4, 105V, 22000μF) at resistance (about 100Ω, 10W) in order to discharge the charged voltage. Do not short between C1 ~ C4 by screwdriver. It may damage the componet.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 50Hz/60Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		AC 110V	AC 120V	AC 220V	AC 240V
Consumed current	50Hz	0.6A ~ 1.8A	0.5A ~ 1.7A	0.3A ~ 0.9A	0.3A ~ 0.9A
	60Hz	0.5A ~ 1.7A	0.4A ~ 1.6A	0.2A ~ 0.8A	0.2A ~ 0.8A

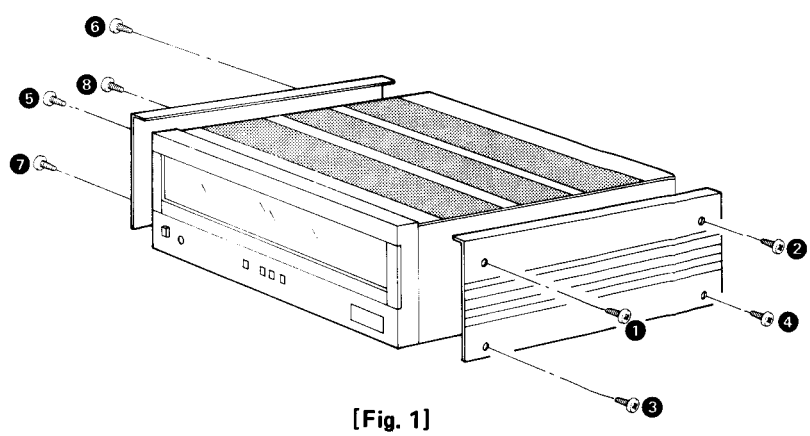
■ LOCATION OF CONTROLS



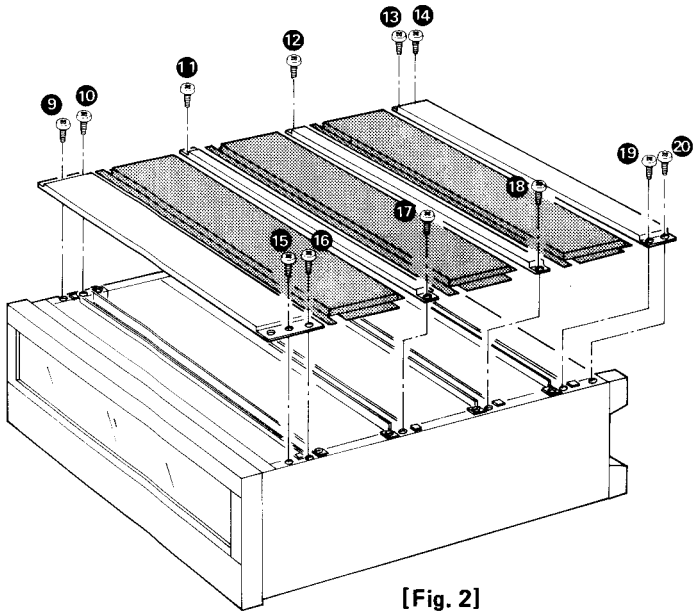


■ DISASSEMBLY INSTRUCTIONS

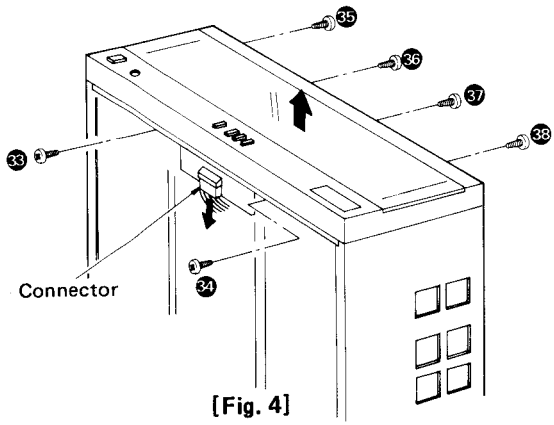
- **How to Remove the Side and Top Boards [Fig. 1, 2]**
  1. Remove the 8 setscrews [Fig. 1: ❶ ~ ❽] of the side board.
  2. Remove the 12 setscrews [Fig. 2: ❾ ~ ⓴] of the top board. Then the top board and punching metal can be removed.



[Fig. 1]

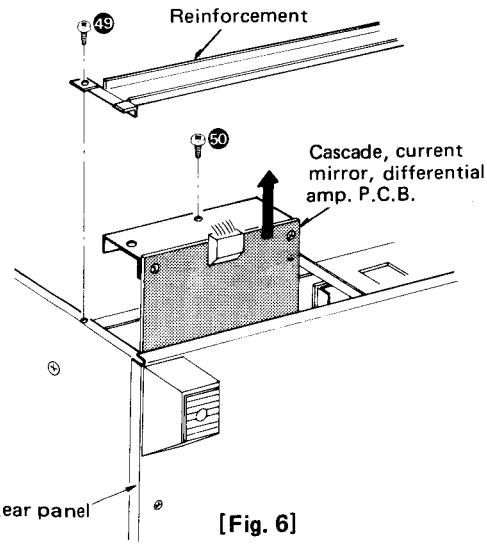


[Fig. 2]



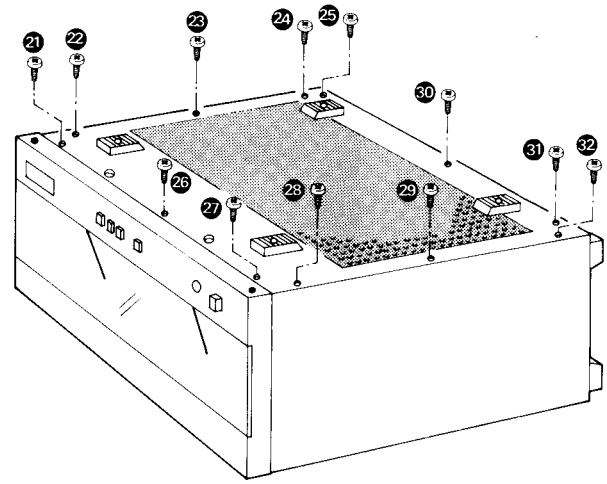
[Fig. 4]

- **How to Remove the Peak Power Meter [Fig. 5]**
  1. Remove the front panel. (Refer to "**How to remove the front panel**".)
  2. Remove the 4 setscrews [Fig. 5: ㊴ ~ ㊷] of the front chassis, and then remove the front chassis as shown in Fig. 5.
  3. Remove the 6 nuts [Fig. 5: ㊸ ~ ㊽] of the peak power meter. Then the peak power meter can be removed.



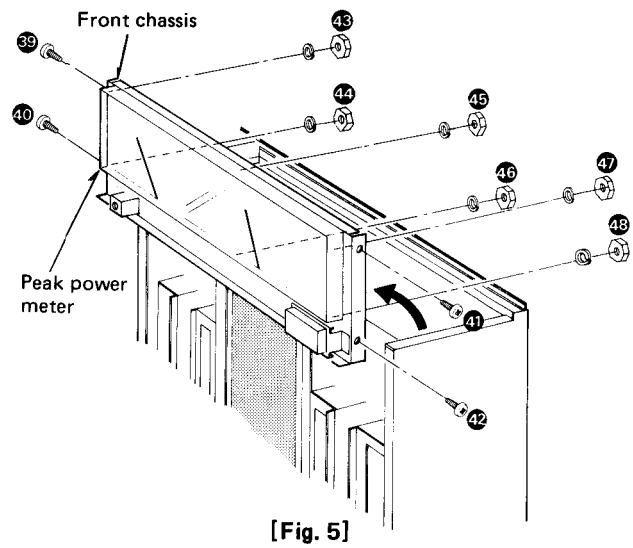
[Fig. 6]

- **How to Remove the Bottom Board [Fig. 3]**
  1. Remove the 12 setscrews [Fig. 3: ㉑ ~ ㉜] of the bottom board. Then the bottom board can be removed.



[Fig. 3]

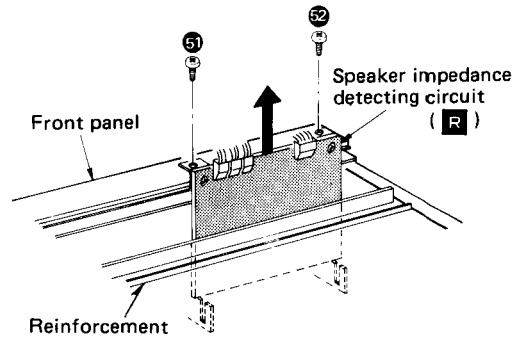
- **How to Remove the Front Panel [Fig. 4]**
  1. Remove the top and bottom boards. (Refer to "**How to remove the side and top boards**" and "**How to remove the bottom board**".)
  2. Remove the 6 setscrews [Fig. 4: ㉝ ~ ㊳] of the front panel and the connector, and then remove the front panel.



[Fig. 5]

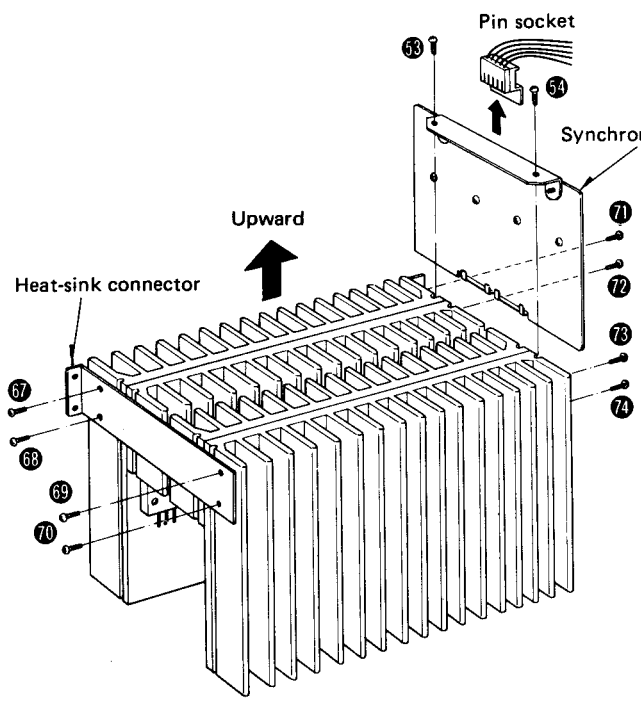
- **How to Remove the Cascade, Current Mirror, Differential Amplifier P.C.B. (C) [Fig. 6]**
  1. Remove the side and top boards. (Refer to "**How to remove the side and top boards**".)
  2. Remove the 2 setscrews [Fig. 6: ㊾ x 2] which fasten the reinforcement.
  3. Remove the setscrew [Fig. 6: ㊿] which secures the cascade, current mirror and differntial amplifier P.C.B., and then pull out the P.C.B.

- **How to Remove the Speaker Impedance Detection Circuit (R) and Icq Control Circuit (O) P.C.B. [Fig. 7]**
  1. Remove the side and top boards. (Refer to "**How to remove the side and top boards**".)
  2. Remove the 2 setscrews [Fig. 7: ㊶ , ㊷] of speaker impedance detecting circuit board (R), and then pull out the P.C.B. in the direction of the arrow.
  3. Icq control circuit can be removed in the same way.

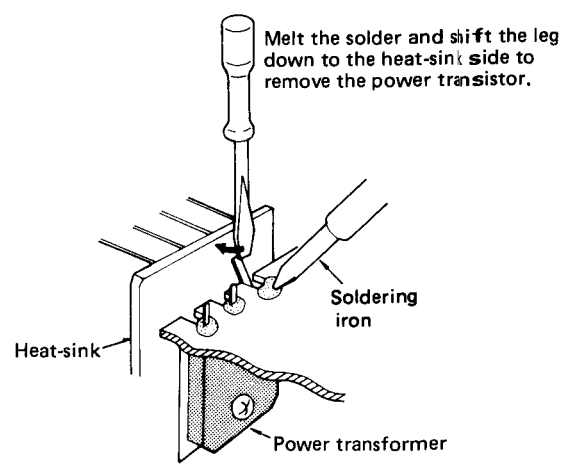


[Fig. 7]

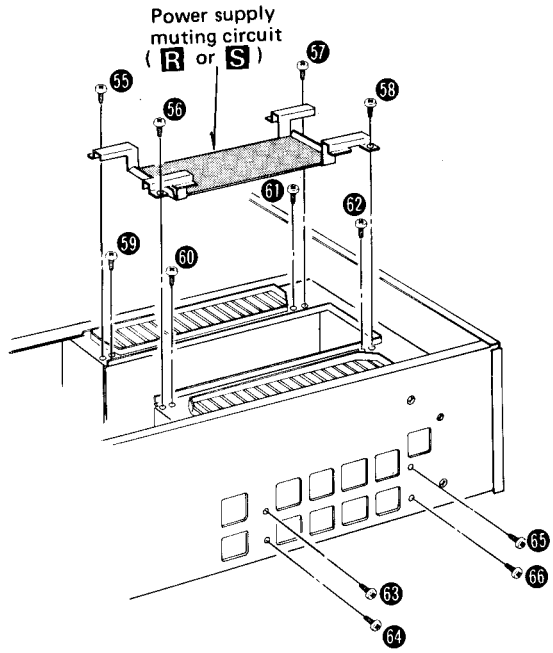
- **How to Remove the Power Transistors [Fig. 8, 9, 10, 11]**
  1. Remove the top and bottom boards. (Refer to "**How to remove the side and top boards**" and "**How to remove the bottom board**".)
  2. Remove the 3 reinforcements at top of the set.
  3. Pull out the pin socket of synchronous bias circuit board (D). Next, remove the 2 setscrews [Fig. 8: ㊸ , ㊹] of the P.C.B. (D), and then remove the P.C.B. (D) upward.
  4. Unsolder the 8 power transistors (Q125 ~ Q128, Q135 ~ Q138) as in Fig. 9.
  5. Remove the 4 setscrews [Fig. 10: ㊺ ~ ㊽] of the power supply muting circuit board (R or S), and then remove the P.C.B. (R or S)
  6. Remove the 4 setscrews [Fig. 10: ㊾ ~ ㊿] which secure the heat-sink from underneath the power block chassis.
  7. Remove the 4 setscrews [Fig. 10: ㊸ ~ ㊻] which secure the heat-sink from side of the set.
  8. Lift the heat-sink to remove it from the chassis.
  9. Remove the 8 setscrews [Fig. 8: ㊼ ~ ㊿] which fasten the heat-sink connector.
  10. Remove the power transistor by removing the 2 setscrews [Fig. 11: ㊺ , ㊻].
  11. When fitting the power transistor, apply silicone compound (or equivalent heat diffusing agent) to the back of power transistor and the mica plate (heat-sink side), and then reversely follow the procedures 1 ~ 10.



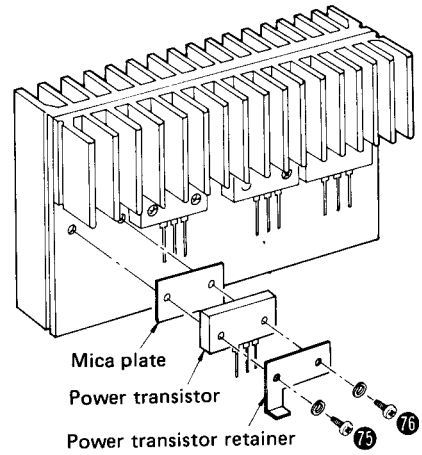
[Fig. 8]


Melt the solder and shift the leg down to the heat-sink side to remove the power transistor.
Soldering iron
Heat-sink
Power transformer

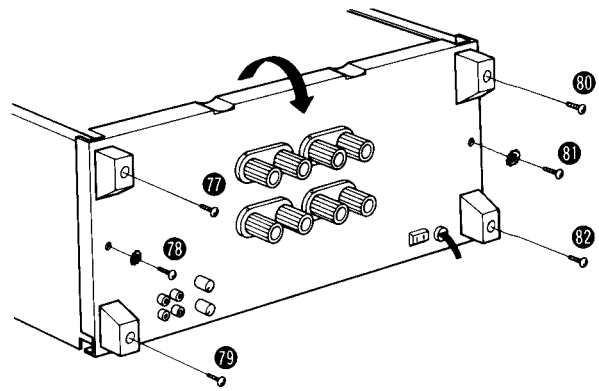
[Fig. 9]



[Fig. 10]



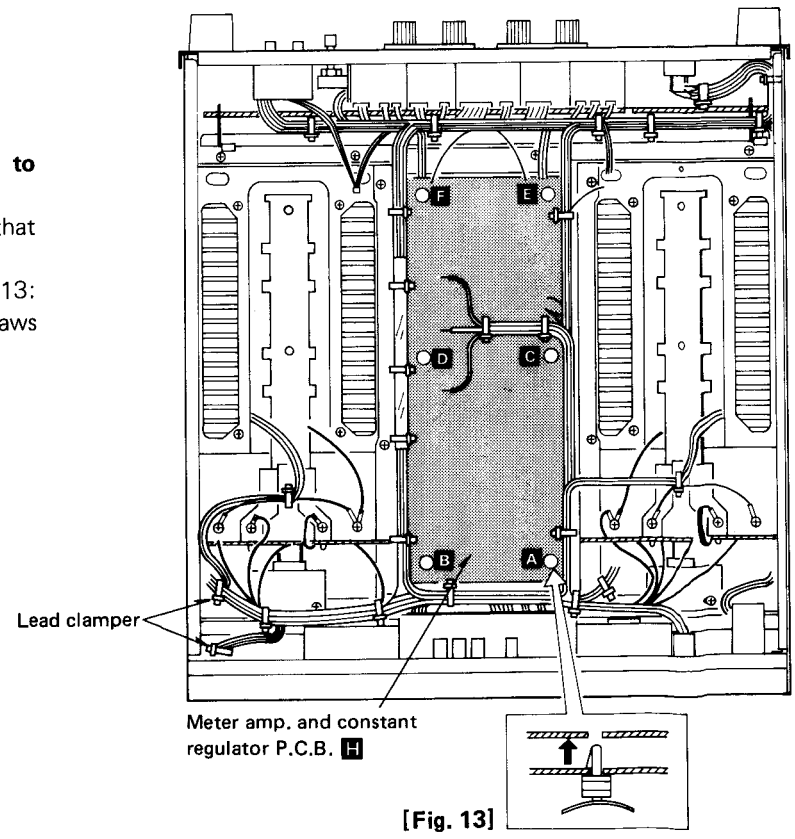
[Fig. 11]



[Fig. 12]

- **How to Remove the Speaker Selector and Protection Circuit P.C.B. (L) [Fig. 12]**
  1. Remove the top and bottom boards. (Refer to "**How to remove the side and top boards**" and "**How to remove the bottom board**".)
  2. Remove the 6 setscrews [Fig. 12: 77 ~ 82] of the rear panel, and then shift the rear panel.
  3. Unsolder the speaker terminals. (8 portions)
  4. Remove the 4 setscrews of the P.C.B. (L) and remove the P.C.B. (L)

- **How to Remove the Meter Amplifier and Regulator P.C.B. (H) [Fig. 13]**
  1. Remove the bottom board. (Refer to "**How to remove the bottom board**".)
  2. Cut off the lead clamper of the lead wire so that the P.C.B. (H) can be easily removed.
  3. P.C.B. (H) is secured with 6 spacers [Fig. 13: A ~ F] as in Fig. 13. Release the spacer claws and then lift the P.C.B.
  4. For the lead wire, refer to Fig. 13.



[Fig. 13]

■ CHECK POINTS FOR REPAIR

- **When protection circuit indicator is lighted:**
  The indicator lights up if the unit is abnormal. It lights up with power supply turned ON, and goes out when the unit is in operation (about 5 sec. later). In case of abnormality during operation, the indicator lights up and then no sound is made. In that case, set the power switch to "off" and check the cause according to the following procedure.

① Set the power switch of this unit to "off", and change the input terminal on the back from "DC" to "NORMAL". Next, set the power switch to "on", and check if the protection circuit indicator lights up.

NO → As the equipment (pre-amp side) other than this unit is out of order, DC power is applied to the input, causing the protection circuit to operate. So, it is not a sign of trouble of this unit.

↓ YES

② Check if computer drive monitor indicator "auto" is lighted.

NO → **Overcurrent and overload detection circuits are operated.**
Check if the line is short-circuited between speaker terminal and speaker side terminal.
NO → Check transistors Q114, Q119, Q120 of temperature protection circuit.
NO → Check power transistors Q125~Q138.
NO → Check transistor Q130 and diode D311 of over-current detection circuit.

NO → **Temperature detection circuit is operated.**
Check if the radiating hole is blocked with a book or audio equipment, worsening the radiating effect.

↓ YES

- **DC detection circuit is operated.**

③ Check if DC voltage is present at terminal (133) of power amplifier P.C.B. E .

NO → Check muting/relay drive IC (IC301) and its adjacent circuits.

↓ YES

④ Check the positive (+B) and negative (−B) voltage of power amplifier P.C.B. E , synchronous bias P.C.B. D , and previous stage differential amplifier P.C.B. C .

ABNOMAL → Regulator circuit is defective or fuse is blown. So, check the regulator circuit.

↓ NORMAL

⑤ Remove the synchronous bias P.C.B. D , then connect terminal ⑧ led to Q125 and Q126 base of power amplifier P.C.B. E , terminal ⑦ led to Q135 and Q136 base, and terminal ③ led to Q137 and Q138 base to the earth line, and then check if DC voltage is present at terminal (133) of power amplifier P.C.B. E .

YES → Power amplifier P.C.B. is defective. So, check power transistors Q125 ~ Q138.

↓ NO

⑥ Connect synchronous bias P.C.B. D to power amplifier P.C.B. E , and remove front stage differential amplifier P.C.B. C . Connect terminal ③ of lead wire (121) to the earth line, and check if DC voltage is present at terminal (133) of power amplifier P.C.B. E .

YES → Synchronous bias P.C.B. D is detective. So, check Q115 ~ Q124.

↓ NO

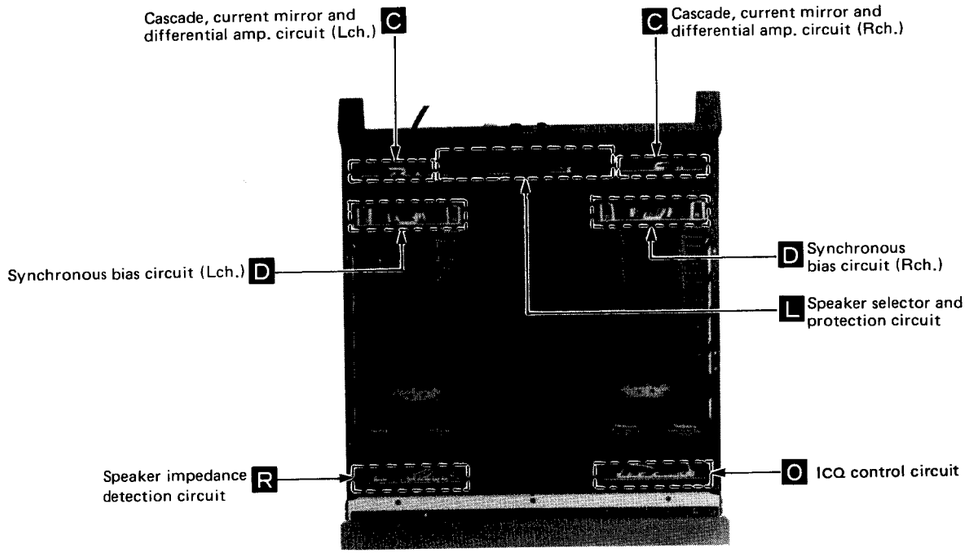
Previous stage differential amplifier P.C.B. C is defective. So, check each transistor.

NOTE

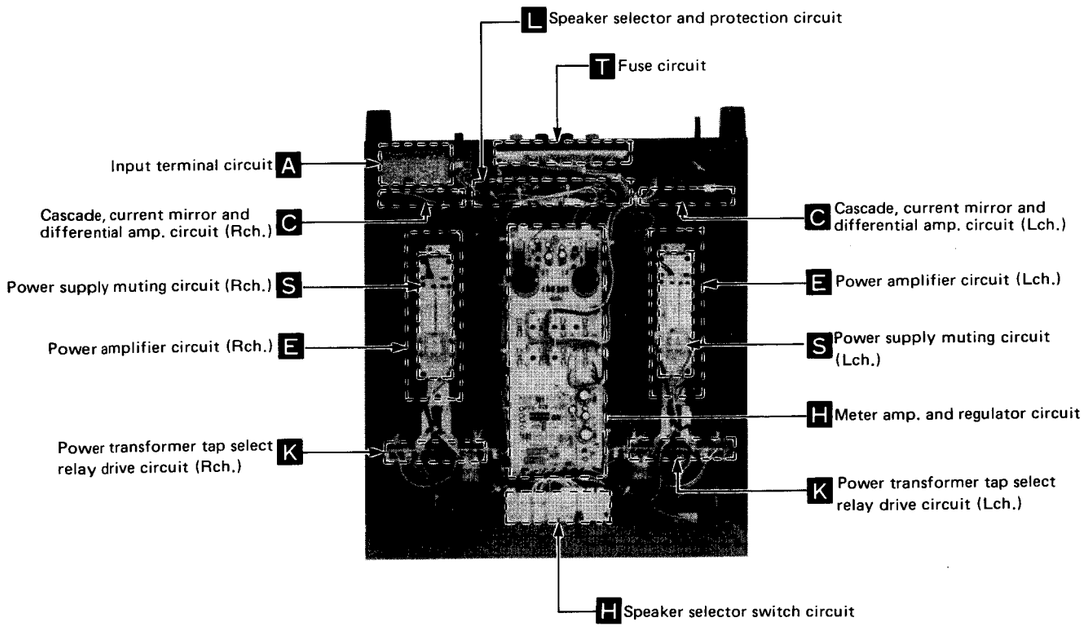
When measuring the circuits in the voltage amplification stage, there is a fear of abnormal oscillation due to input impedance of the tester. So, when a tester whose input impedance is below or over 1 MΩ is used, respectively connect a 10 kΩ or 47 kΩ resistor in series to the tester.

■ LOCATION OF P.C.B.

- **Top view**


Cascade, current mirror and differential amp. circuit (Lch.) C
C Cascade, current mirror and differential amp. circuit (Rch.)
Synchronous bias circuit (Lch.) D
D Synchronous bias circuit (Rch.)
L Speaker selector and protection circuit
Speaker impedance detection circuit R
O ICQ control circuit

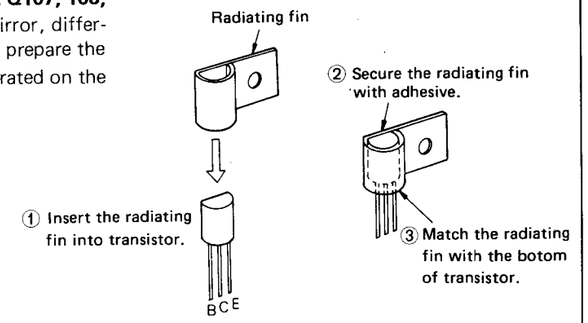
- **Bottom view**


L Speaker selector and protection circuit
T Fuse circuit
Input terminal circuit A
Cascade, current mirror and differential amp. circuit (Rch.) C
C Cascade, current mirror and differential amp. circuit (Lch.)
Power supply muting circuit (Rch.) S
E Power amplifier circuit (Lch.)
Power amplifier circuit (Rch.) E
S Power supply muting circuit (Lch.)
H Meter amp. and regulator circuit
Power transformer tap select relay drive circuit (Rch.) K
K Power transformer tap select relay drive circuit (Lch.)
H Speaker selector switch circuit

NOTE

To repair or replace transistors **Q110, 115, 118 (2SC1573NC), Q107, 108, 109, 116, 117 (2SA879NC)** used on the cascade, current mirror, differential amplifier P.C.B. (C) and synchronous bias P.C.B. (D), prepare the radiating fin packed along with transistor repair parts as illustrated on the right.

Circuit diagram No.	Transistor	Repair part No.
Q110, 115, 118	2SC1573NC	SWV61
Q107, 108, 109 116, 117	2SA879NC	SWV59


Radiating fin
② Secure the radiating fin with adhesive.
① Insert the radiating fin into transistor.
③ Match the radiating fin with the botom of transistor.
B C E

■ MEASUREMENTS AND ADJUSTMENTS

- **Voltage regulator adjustment (after repair of voltage regulator circuit).**
  - ① After the repair, turn the voltage regulator adjusting **VR201** to minimum position before turning power supply ON, and connect nothing to the speaker terminals.
  - ② Connect a DC voltmeter between TP5 (+) and TP4 (earth), and adjust **VR201** so that the voltage is **+90**V.
  - ③ Next, connect a DC voltmeter between TP3 (+) and TP4 (earth), then make sure the value is within **–89** to **–92**V.

- **DC balance adjustment (after repair of power and drive amplifier circuit)**
  - ① After the repair, turn the sound volume and **VR103** to the minimum positions before turning power supply ON, and connect nothing to the speaker terminals.
  - ② Connect a DC voltmeter between TP2 (+) and TP4 (earth), and adjust **VR103** to 0mV in 30mV range.
  - ③ If it is not adjustable, pull out J101 and make the above-mentioned adjustment.

- **Clock adjustment (after replacement of microcomputer)**
  - ① Connect an oscilloscope to TP701, and adjust **VR701** so that the period of waveform is 3.3μ-sec. (Refer to Fig. 14.)

- **Idling current (I_{CQ}) and clamp voltage adjustment (after repair of power and drive amplifier)**
  - ① After the repair, maximize the sound volume before turning power supply ON, and connect nothing to the speaker terminals.
  - ② Turn I_{CQ} adjusting **VR104** (both L ch and R ch) and **VR105** (both L ch R ch) to the minimum positions.
  - ③ Connect a DC voltmeter between TP1 and TP2.

Note

*** During idling current and clamp voltage adjustment, if the DC voltmeter is metallic case or earth line comes in touch with other equipment, the transistors, etc. of this unit may be damaged. So, be sure to keep the DC voltmeter away from other equipment.**

  - ④ Connect a low frequency oscillator to the input terminal and apply 400Hz, 300mV signal to the circuit.
  - ⑤ With power turned ON, adjust **VR104** so that the voltage is approx. 19mV, about 10 minutes after computer drive monitor "auto" is lighted.
  - ⑥ Next, adjust **VR105** so that the voltage between TP1 and TP2 is approx. 20mV.

Note

In this set, I_{CQ} is controlled by microcomputer. I_{CQ} is a little more than usual due to "PREHEAT" for 20 sec. after power ON. After that, the output level and transistor temperature are detected in "AUTO" mode, thereby automatically controlling I_{CQ}.

■ OPERATION OF Icq CONTROLLER

1) Operation of PREHEAT

This circuit is intended that a great idling current is forcibly applied to the power transistor by the microcomputer for a specific length of time so that the power transistor condition becomes optimum as soon as possible after power supply ON. With power turned ON, "H" output is delivered to terminal ⑰ of IC701 as in Table 1, causing Q752 to turn ON. And then preheat LED lights up, and a voltage is also applied to the LED's of D755, D756 and D757. Each of these diodes is controlled by terminals ②, ③ and ④ of IC701. After power ON, "high" LED lights up first, followed by "mid" and "low" in order. Also, during preheat, "L" output is delivered to terminal ㉓ of IC701, then Q705 and 706 turn ON through IC703. As Q705 and 706 turn ON, the base voltage of Q106 (driver stage transistor) is lowered, and a current more than usual flows in Q106, thus preheating the power stage.

2) Signal detection and temperature detection

Music signal from power amplifier is applied to IC701 terminals ⑪ and ⑫ [terminals ⑬, ⑭] through D703 (D704) and IC702. When the signal rectified by D703 (D704) and C703 (C704) becomes 3V or over, then "L" input is applied to IC701 terminal ⑫ [terminal ⑭] and when the signal becomes 9V or over, then "L" input is applied to IC701 terminal ⑪ [terminal ⑬]. Z761 (Z762) is a thermistor (posistor) for radiator temperature detection, and serves to detect the temperatures of heat-sink such as 60°C, 100°C and 130°C. When the heat-sink temperature is 60°C, the 60°C sensor of Z761 (Z762) increases in resistance, then the level of IC702 terminal ② becomes "H". Also, IC702 terminal ⑮ is inverted to "L" and it is applied to terminal ⑩ of IC701.

Similarly, heat-sink temperatures are detected at 100°C and 130°C, and the inputs are applied to IC701 terminals ⑨ and ⑧. When music signal and temperature detection signal are applied to IC701 terminals ⑧ ~ ⑭, the outputs are delivered to IC701 terminals ② ~ ⑥, thereby controlling I_{CQ} through R721 ~ 726, Q705 and Q706.

When the music signal is in a range of 0 ~ 1.3V or so, the level of IC702 terminal ⑦ becomes "L", while IC702 terminal ⑩ goes "H". It is applied to IC702 terminals ① and ② as "H" input, then IC701 operates as if the 60°C and 100°C temperature sensors were operating.

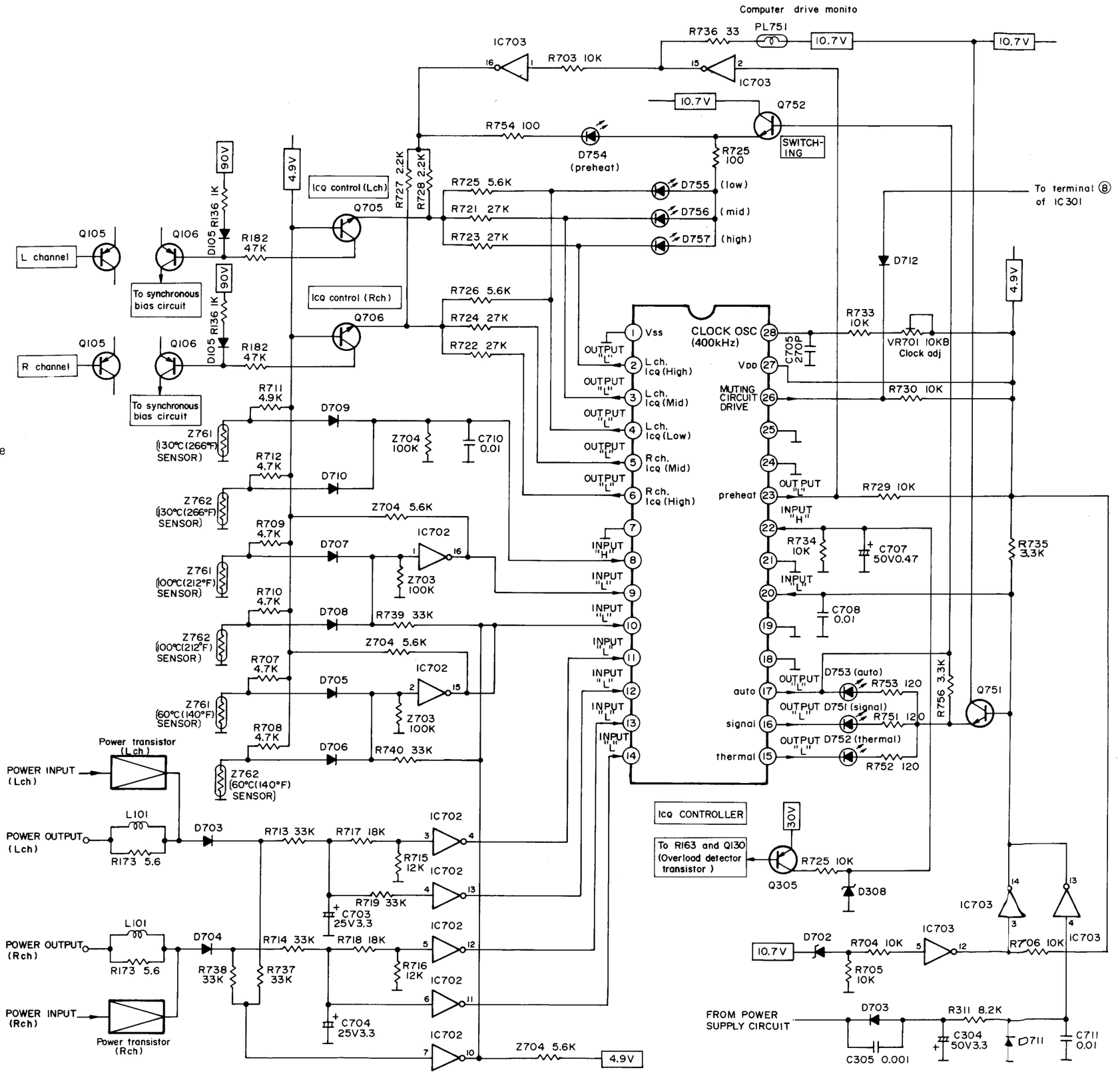
3) Power ON/OFF muting

With power turned ON, the output of IC701 terminal ㉖ is at "L" for about 5 sec., and "L" input is applied to terminal ⑧ of IC301 (muting and speaker relay drive IC), causing speaker relay RLY301 ~ 303 to turn OFF. With power turned OFF, "H" input is applied to IC703 terminal ④, and "L" input is applied to IC701 terminal ⑳ because the time constant of C304 (3.3μF) and R311 (8.2 kΩ) is smaller than that of block electrolytic condenser of power supply circuit. As terminal ⑳ goes "H", then "L" output is delivered to terminal ㉖. It is applied to IC301 terminal ⑧, causing speaker relay RLY 301 ~ 303 to turn OFF.

4) Overload detection circuit

When speaker terminals are shortcircuited, a great current flows in R163, then the base potential of Q130 (overload detection circuit) increases causing Q130 to turn ON. Then Q305 also turns ON, and "H" input is applied to IC701 terminal ㉒. And "L" output is delivered to IC701 terminal ㉖. As IC701 terminal ㉖ goes "L", speaker relay RLY301 ~ 303 turn OFF the same as for power OFF muting.

When "H" input is applied to IC701 terminal ㉒, then the output of IC701 terminal ㉖ is held causing power switch to turn OFF, therefore the speaker relay will not turn ON unless the set is checked beforehand.



- **Load impedance detection circuit adjustment (after repair of load impedance detection circuit)**
  1. Set the speaker select switch to "main" position, and the sound volume to minimum.
  2. Connect a 6.5 Ω (1W) or 2 series-connected resistors of 6.5 Ω to "main" speaker terminals.
  3. Connect TP601 and TP602 with lead wire.
  4. Turn power supply ON and turn **VR602** counterclockwise. (Then, the sound of tap relay operation can be heard.)
  5. Connect a DC voltmeter between TP601 and TP605, and then adjust **VR601** so that the voltage is **−200mV** (−80mV to −400mV).
  6. Connect a DC voltmeter between TP601 and TP604, and then adjust **VR602** so that the voltage is **−200**mV (−80mV to −400mV).
  7. Disconnect the lead wire that connects TP601 and TP602, then make sure the tap relay is switched.

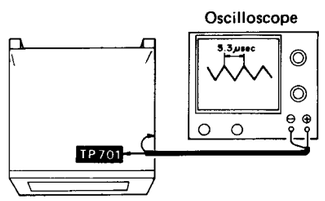
- **Peak power meter adjustment (after replacement of meter amplifier circuit and peak power meter)**
  1. Before power ON, completely turn **VR403** and **VR404** clockwise.
  2. Connect a low frequency oscillator to "Input DC" terminal, and AC voltmeter to speaker terminals.
  3. Apply 1kHz signal from the low frequency oscillator, and adjust the output volume of oscillator so that the AC voltmter reads **0.894**V.
  4. Adjust the meter adjusting **VR401** (L ch) and **VR402** (R ch) so that the meter reads 0.1W.
  5. Adjust the output volume of low frequency oscillator so that the AC electronic voltmeter connected to speaker terminals reads **48.99**V.
  6. Adjust the meter adjusting **VR403** (L ch) and **VR404** (R ch) so that the meter reads **300**W.

- **Overload detecting protection circuit check**
  1. Set the speaker select switch to "main" position.
  2. Connect a 0.33 Ω (30W) resistor to remote speaker terminal.
  3. Connect a low frequency oscillator to "INPUT" terminal, and AC voltmeter to main speaker terminal.
  4. Apply 1kHz signal from the low frequency oscillator, and adjust the output volume of oscillator so that the AC voltmeter reads **5V**.
  5. With the speaker select switch shifted to "remote" position, if the relay turns off, then the protection circuit is in normal operation.

Note

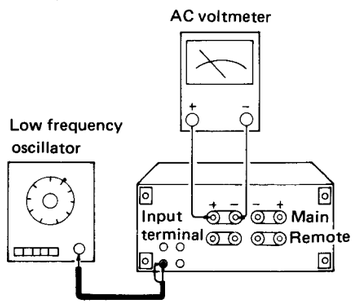
* **Check the protection circuit individually on each channel.**

* **If the protective relay is operated, it will not be reset even when abnormality has been eliminated. So, once turn power supply OFF and again turn it ON.**



[Fig. 14]

Clock adjustment

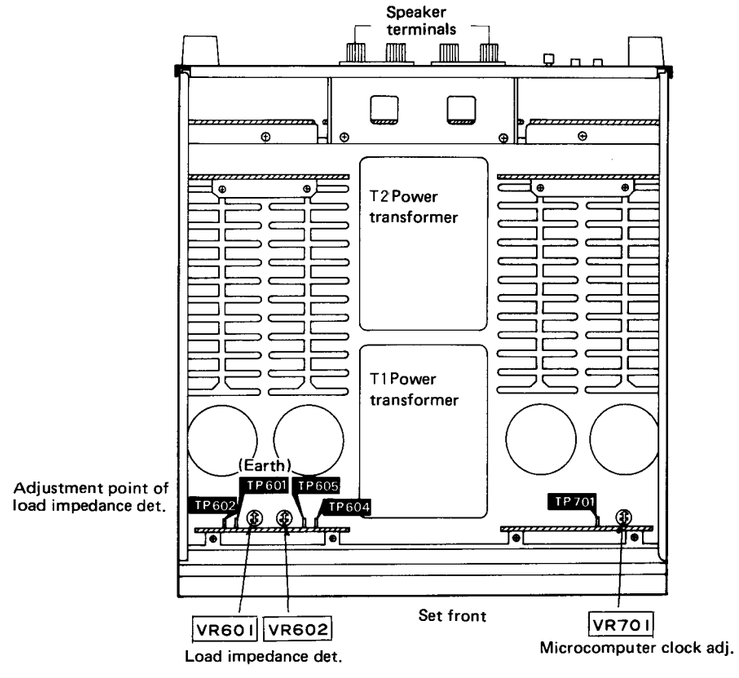


[Fig. 15]

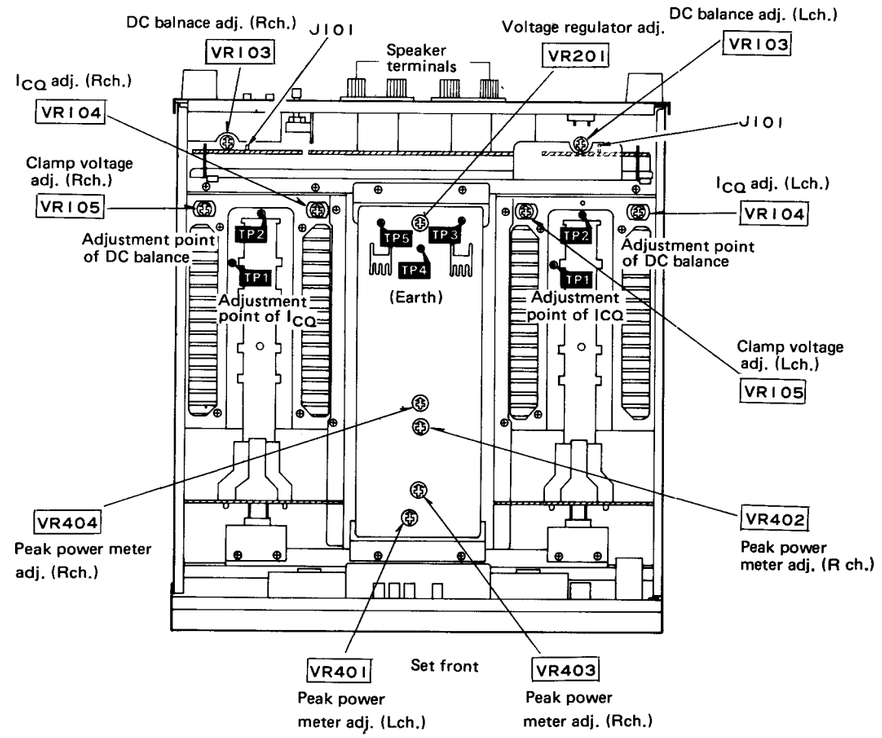
Peak power meter adjustment

- **Adjustment points**

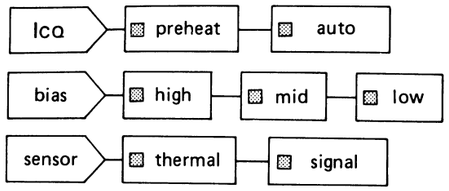
Top view



Bottom view



- **Computer drive monitor indicators**
  These indicators are used to check that stable idling current flows from the bias circuit in order to prevent transient crossover distortion.



Icq:
When the power is switched on, the heat-sink is preheated so that the bias circuit can immediately operate. The "preheat" indicator will illuminate at this time, and then, when the circuit is fully stabilized, the "auto" indicator will illuminate.

bias:
When the power is switched on, the bias changes from high, mid and low during the time until the idling current becomes stabilized, and the respective indicators illuminate.
Note that the display will no longer illuminate when the idling current has reached a condition of stability.

sensor:
The "thermal" sensor detects the temperature of the output transistor(s) and heat-sink, and the "signal" sensor detects the music signal level. Both indicators will illuminate when the sound can be heard.

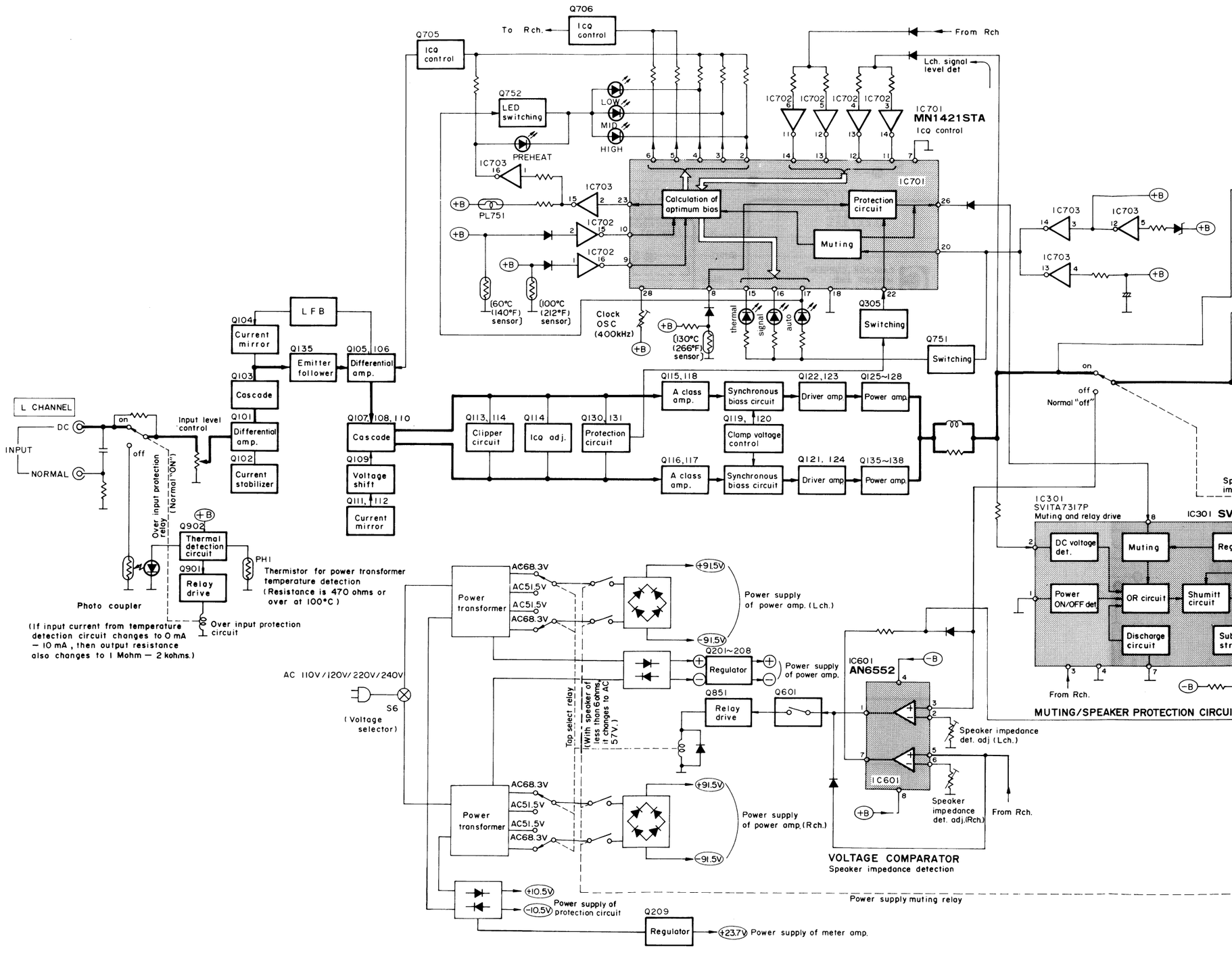
▒ "ON" (light up) time

Output port	④ pin CO_7	③ pin CO_8	② pin CO_9	⑮ pin EO_0	⑯ pin EO_1	⑰ pin EO_2	㉓ pin DO_0
Ind. / sec.	bias low	bias mid	bias high	sensor thermal	sensor signal	ICQ auto	ICQ preheat
Power "ON"	Ⓗ	Ⓗ	Ⓛ	Ⓛ	Ⓛ	Ⓗ	Ⓛ
0.4 sec.							
0.4 sec.							
0.4 sec.							
0.4 sec.		Ⓛ	Ⓗ		Ⓗ		
0.4 sec.							
0.4 sec.							
0.4 sec.							
0.4 sec.				Ⓗ	Ⓛ		
0.4 sec.							
0.4 sec.							
0.4 sec.	Ⓛ	Ⓗ			Ⓗ		
0.4 sec.							
0.4 sec.							
14 sec.	Ⓗ		Ⓛ	Ⓛ	Ⓛ		
∫			Ⓗ			Ⓛ	Ⓗ

About 6 sec.

[Table 1]

■ BLOCK DIAGRAM

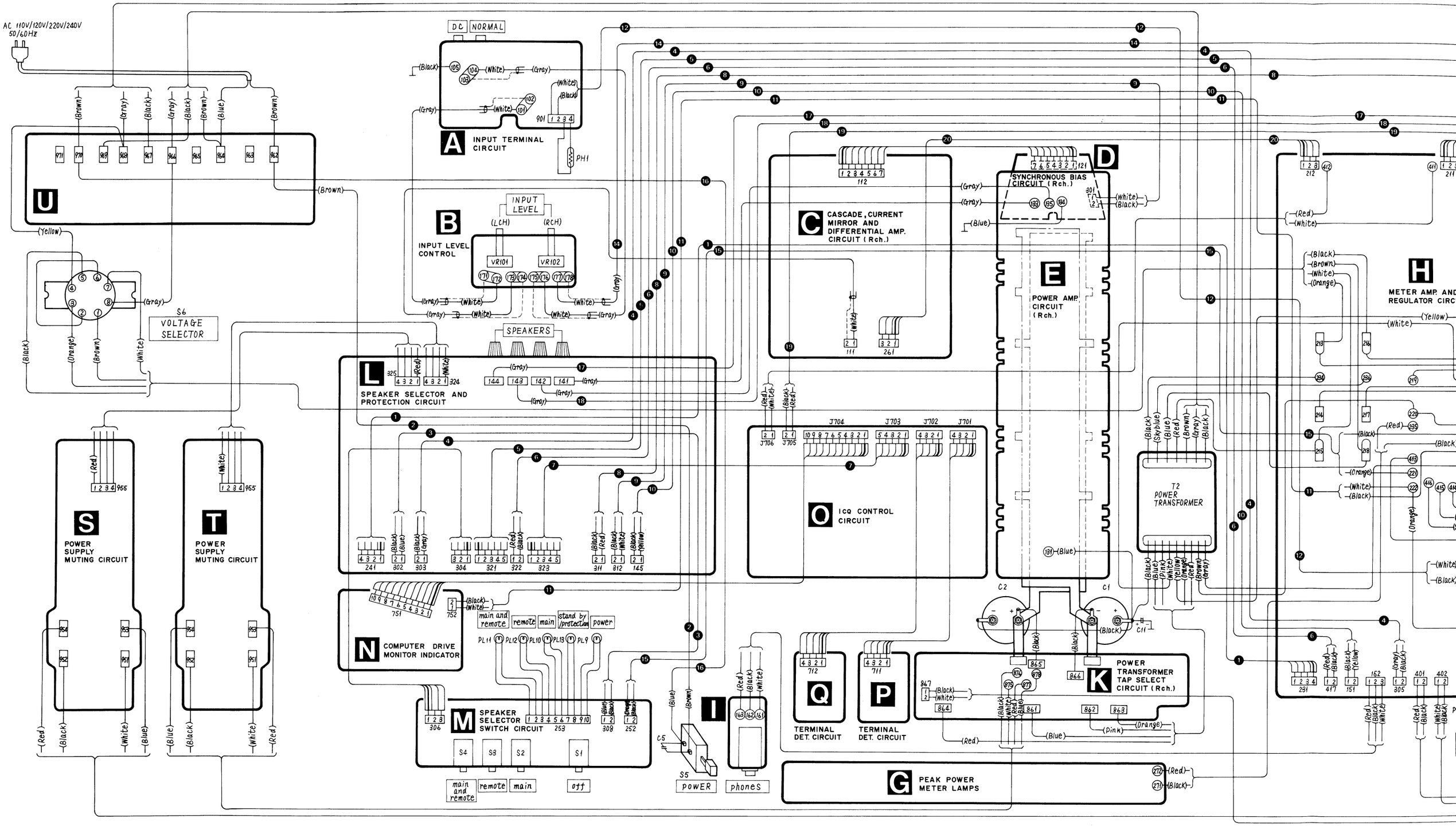


SE-A3MK2

AM

Q706 ICQ control
To Rch.
Q705 ICQ control
From Rch
Lch. signal level det
Q752 LED switching
LOW
MID
HIGH
PREHEAT
IC702 IC702 IC702 IC702
IC701 MN1421STA ICQ control
IC703
IC703
PL751
IC702
IC702
(60°C (140°F) sensor)
(100°C (212°F) sensor)
Clock OSC (400kHz)
(130°C (266°F) sensor)
thermal
signal
auto
Calculation of optimum bias
Protection circuit
Muting
IC701
Q305 Switching
Q751 Switching
IC703 IC703
IC703
IC401 SVITA7318P Detector circuit and power compressor
GND
Detector
Detector
VCC
IC402 AN6552 Meter drive
Peak power meter (Lch.)
Peak power meter (Rch.)
Rch.
on
off
on
off
Meter relay (normal "ON")
Headphones jack
To Rch.
Main speaker
Remote speaker
on
off
Normal "off"
Speaker protection and speaker impedance det. relay
LFB
Q104 Current mirror
Q135 Emitter follower
Q105, 106 Differential amp.
Q103 Cascade
Q101 Differential amp.
Q102 Current stabilizer
Input level control
Q107, 108, 110 Cascade
Q109 Voltage shift
Q111, 112 Current mirror
Q113, 114 Clipper circuit
Q114 ICQ adj.
Q130, 131 Protection circuit
Q115, 118 A class amp.
Q116, 117 A class amp.
Synchronous biass circuit
Synchronous biass circuit
Q119, 120 Clamp voltage control
Q122, 123 Driver amp
Q121, 124 Driver amp
Q125~128 Power amp
Q135~138 Power amp
IC301 SVITA7317P Muting and relay drive
IC301 SVITA7317P
DC voltage det.
Muting
Regulator
Power ON/OFF det
OR circuit
Shumitt circuit
Relay drive
Discharge circuit
Sub straight
Output becomes "H" in muting mode
From Rch.
MUTING/SPEAKER PROTECTION CIRCUIT
Q902 Thermal detection circuit
Q901 Relay drive
PH1 Thermistor for power transformer temperature detection (Resistance is 470 ohms or over at 100°C)
Over input protection circuit
rature to 0 mA tance 2 kohms.)
Power transformer
AC68.3V
AC51.5V
AC51.5V
AC68.3V
+91.5V
-91.5V
Power supply of power amp. (Lch.)
Q201~208 Regulator
Power supply of power amp.
AC 110V/120V/220V/240V
S6 (Voltage selector)
Tap select relay
(With speaker of less than 6ohms, it changes to AC 57V.)
Q851 Relay drive
Q601
IC601 AN6552
Speaker impedance det. adj (Lch.)
Speaker impedance det. adj.(Rch.)
From Rch.
Power transformer
AC68.3V
AC51.5V
AC51.5V
AC68.3V
+91.5V
-91.5V
Power supply of power amp.(Rch.)
VOLTAGE COMPARATOR
Speaker impedance detection
+10.5V
-10.5V
Power supply of protection circuit
Q209 Regulator
+23.7V Power supply of meter amp.
Power supply muting relay
Q603 Latch released
Q604
Q351
Q302 Relay drive
Q306, 602
Integration circuit
Integration circuit
A pulse as shown is made when speaker switch is operated.
Remote speaker select relay
Remote speaker select relay
Q301
Q303, 304
Peak power meter protection relay
PL13 Protection circuit ind.
Power supply of AC
Power ind. PL9
S1 (OFF)
on
off
S2 (MAIN)
Main speaker ind. PL10
ON
OFF
Power supply of AC
S3 (REMOTE)
Remote speaker ind. PL12
S4 (MAIN + REMOTE)
Main + remote speaker ind. PL11

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top View)



C CASCADE, CURRENT MIRROR AND DIFFERENTIAL AMP. CIRCUIT (Rch.)

D SYNCHRONOUS BIAS CIRCUIT (Rch.)

E POWER AMP. CIRCUIT (Rch.)

H METER AMP. AND REGULATOR CIRCUIT

D SYNCHRONOUS BIAS CIRCUIT (Lch.)

E POWER AMP. CIRCUIT (Lch.)

C CASCADE, CURRENT MIRROR AND DIFFERENTIAL AMP. CIRCUIT (Lch.)

Q ICQ CONTROL CIRCUIT

T2 POWER TRANSFORMER

T1 POWER TRANSFORMER

R SPEAKER & IMPEDANCE DETECTION CIRCUIT

I

Q TERMINAL DET. CIRCUIT

P TERMINAL DET. CIRCUIT

K POWER TRANSFORMER TAP SELECT CIRCUIT (Rch.)

J POWER TRANSFORMER TAP SELECT CIRCUIT (Lch.)

PEAK POWER METER (R) (L)

G PEAK POWER METER LAMPS

F PEAK POWER METER LAMPS

PH1

S1 off

S5 POWER

phones

C5

C1 C2 C3 C4 C11 C12

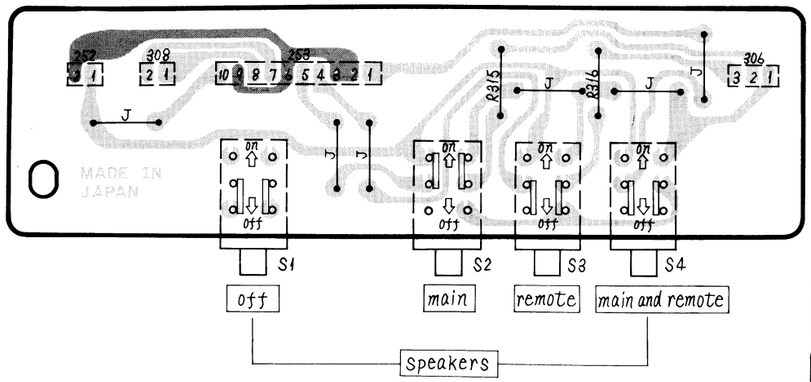
Stand by /protection power

PL18 PL9

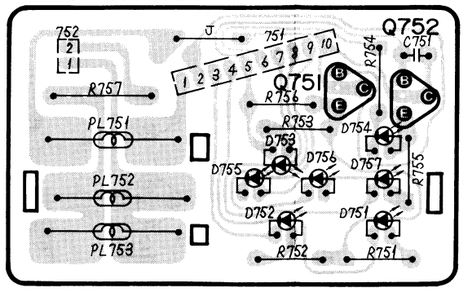
■ PRINTED CIRCUIT BOARDS

Ground (Earth) line

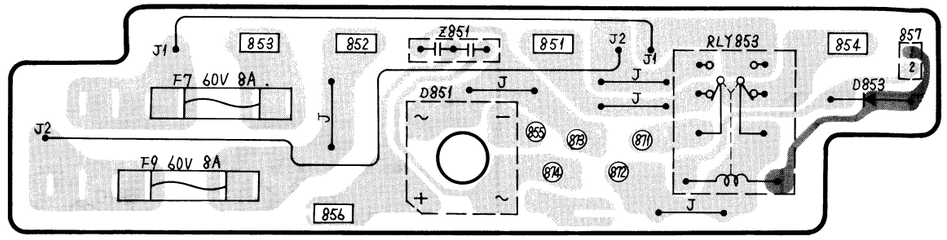
M SPEAKER SELECTOR SWITCH CIRCUIT



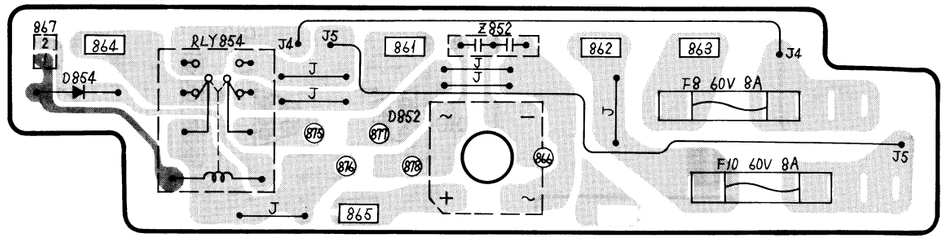
N COMPUTER DRIVE MONITOR INDICATOR



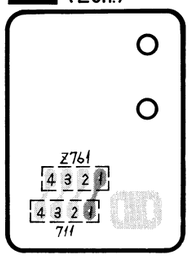
J POWER TRANSFORMER TAP SELECT CIRCUIT (Lch.)



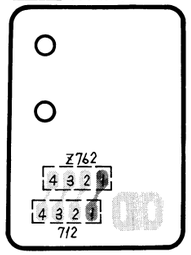
K POWER TRANSFORMER TAP SELECT CIRCUIT (Rch.)



P THERMAL DET. CIRCUIT (Lch.)

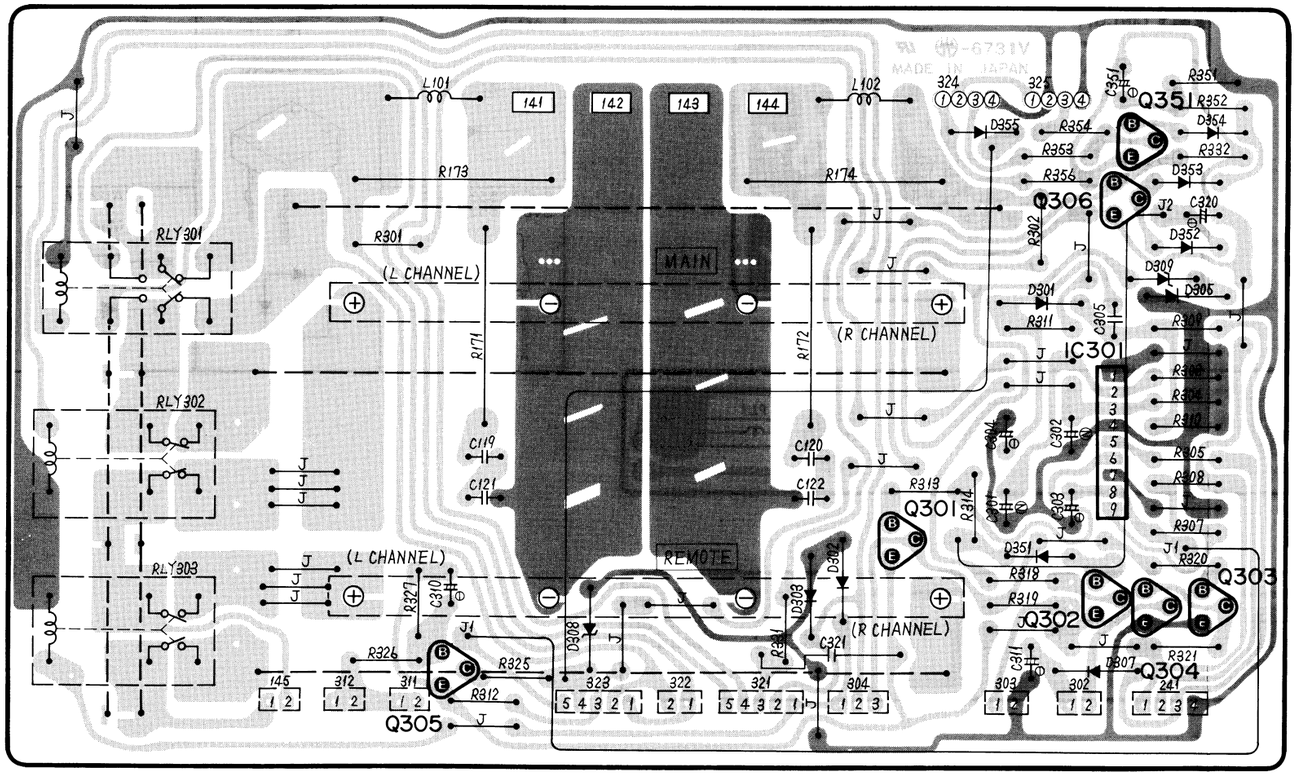


Q THERMAL DET. CIRCUIT (Rch.)



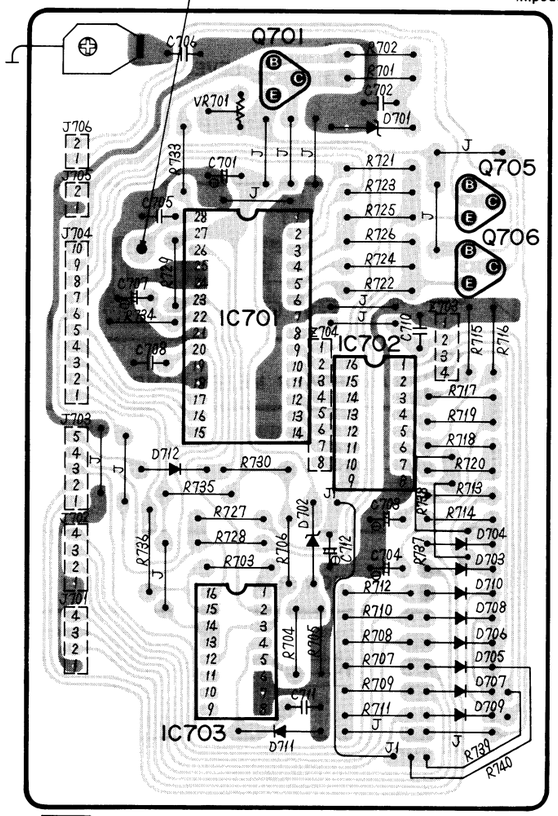
D751: SIGNAL IND.
D752: THERMAL IND.
D753: AUTO IND.
D754: PREHEAT IND.
D755: LOW IND.
D756: MID IND.
D757: HIGH IND.

L SPEAKER SELECTOR AND PROTECTION CIRCUIT



O Icq CONTROL CIRCUIT

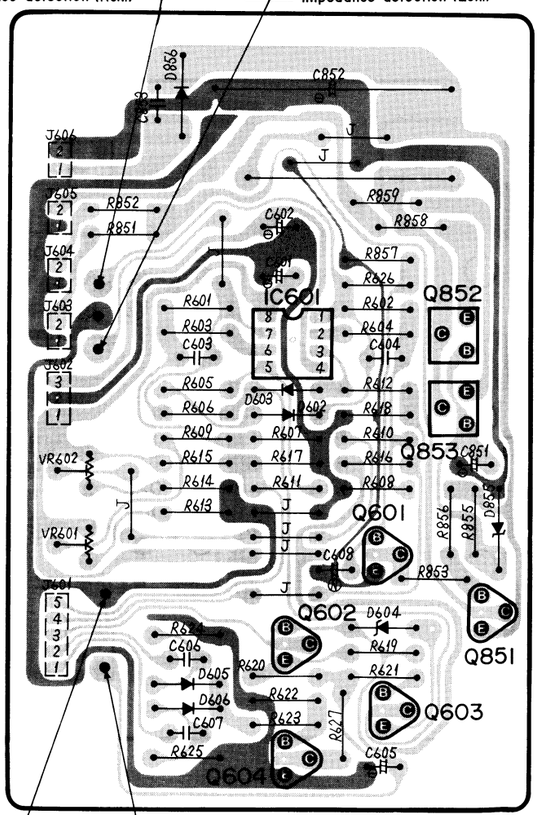
Adjustment point of clock (400kHz) TP701



R SPEAKER & IMPEDANCE DETECTION CIRCUIT

Adjustment point of load impedance detection (Rch.) TP604

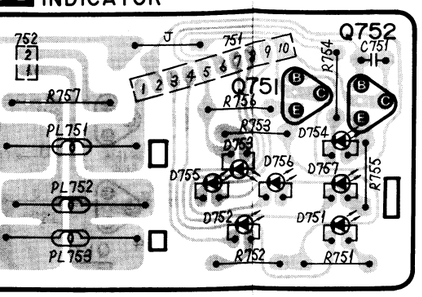
Adjustment point of load impedance detection (Lch.) TP605



TP601 Ground point

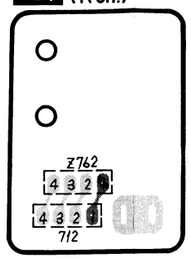
TP602 Ground point

N COMPUTER DRIVE MONITOR INDICATOR

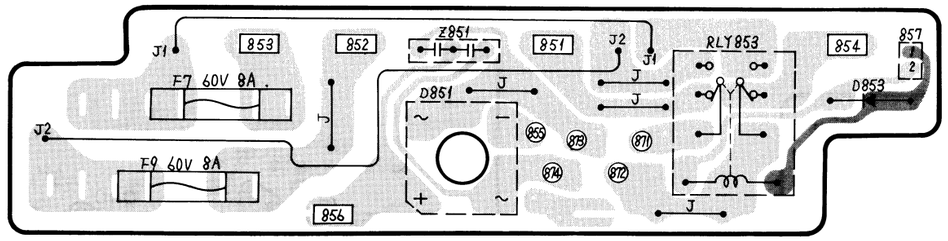


D751: SIGNAL IND.
D752: THERMAL IND.
D753: AUTO IND.
D754: PREHEAT IND.
D755: LOW IND.
D756: MID IND.
D757: HIGH IND.

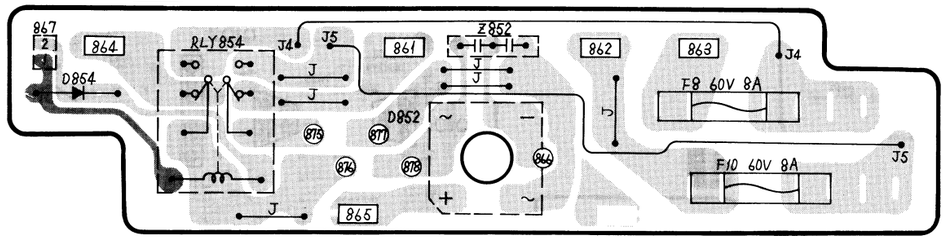
Q THERMAL DET. CIRCUIT (Rch.)



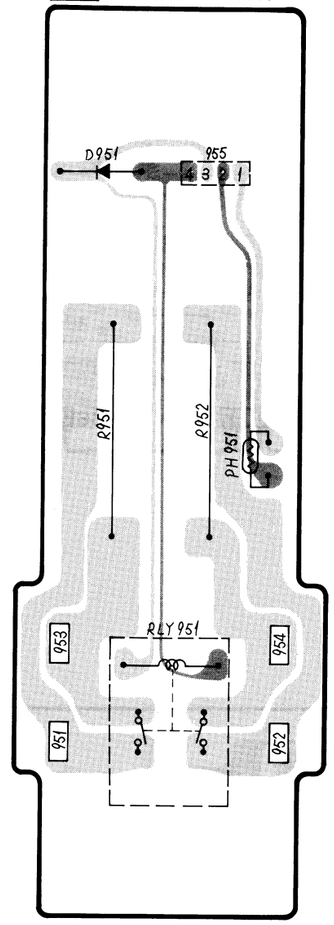
J POWER TRANSFORMER TAP SELECT CIRCUIT (Lch.)



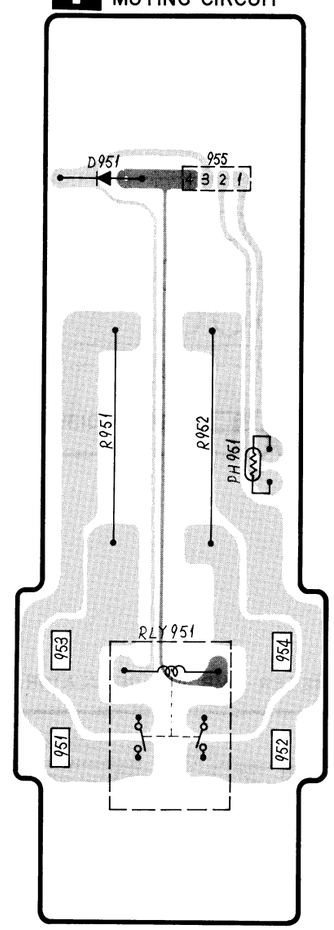
K POWER TRANSFORMER TAP SELECT CIRCUIT (Rch.)



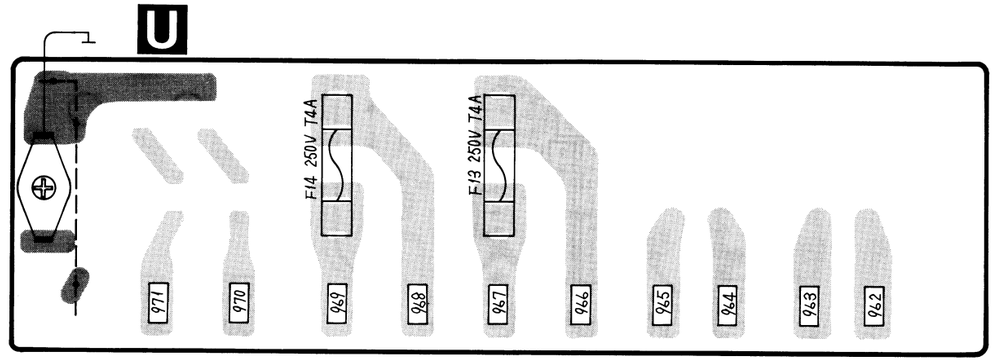
S POWER SUPPLY MUTING CIRCUIT



T POWER SUPPLY MUTING CIRCUIT



U



Adjustment point of clock (400kHz) TP701

Adjustment point of load impedance detection (Rch.) TP604

TP605 Adjustment point of load impedance detection (Lch.)

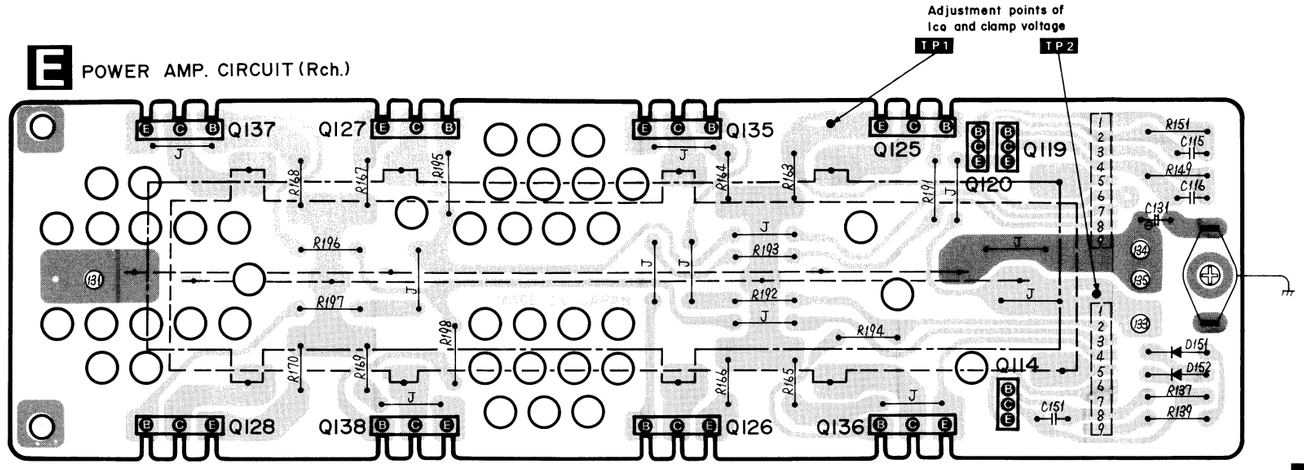
TP601 Ground point

TP602 Ground point

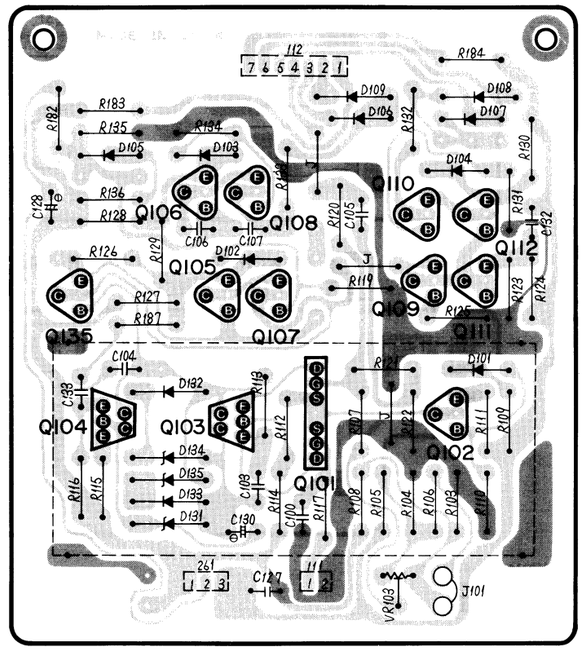
O ICQ CONTROL CIRCUIT

R SPEAKER & IMPEDANCE DETECTION CIRCUIT

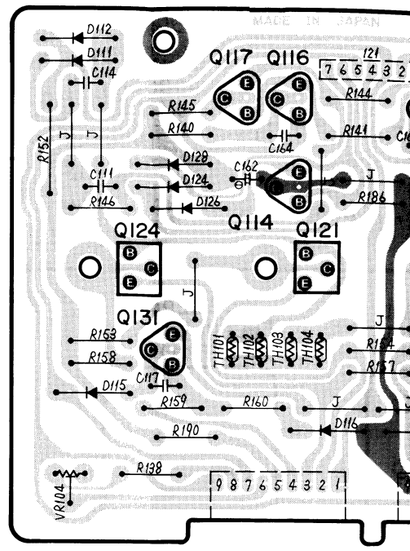
E POWER AMP. CIRCUIT (Rch.)



C CASCADE, CURRENT MIRROR AND DIFFERENTIAL AMP. CIRCUIT (Lch.)



D SYNCHRONOUS BIAS CIRCUIT (Lch.)



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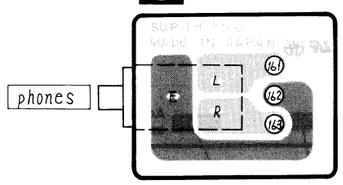
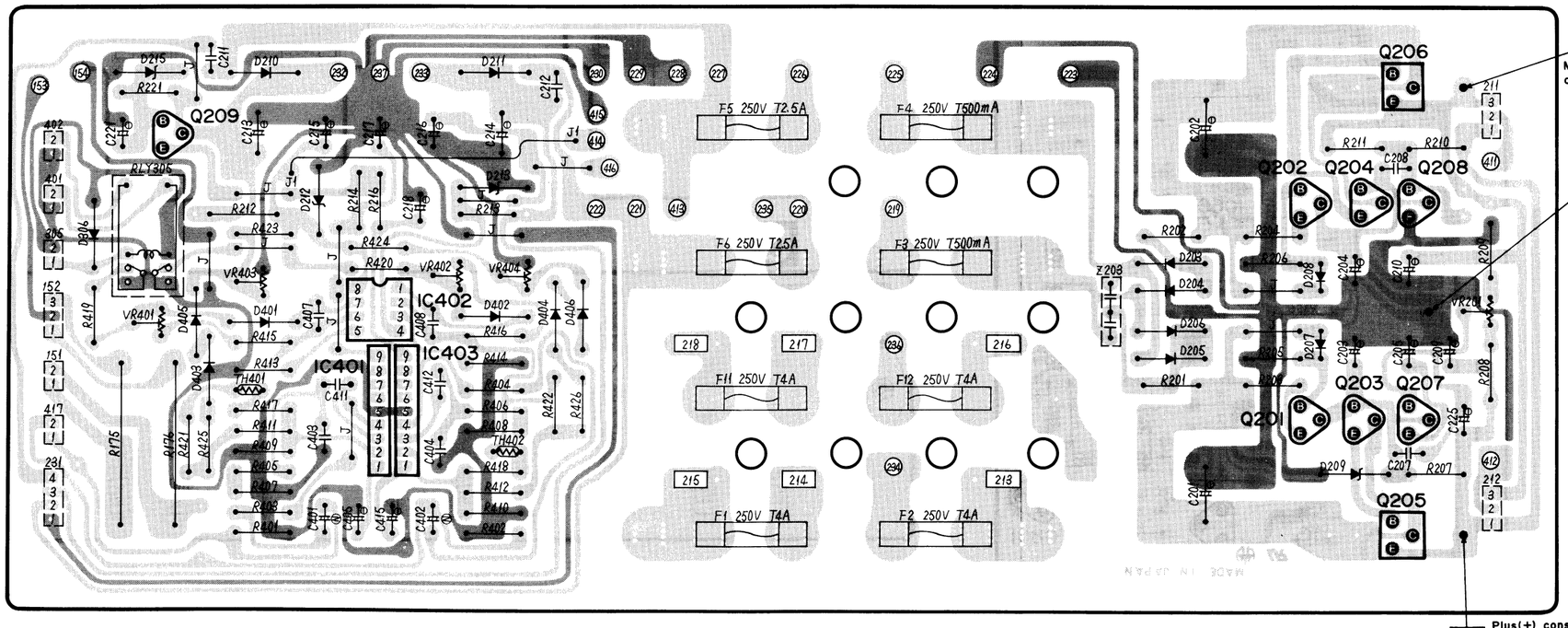
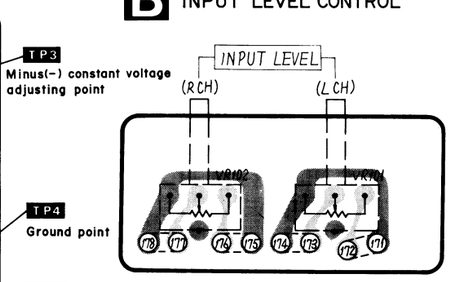


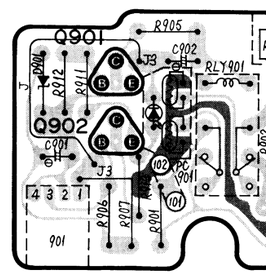
H METER AMP. AND REGULATOR CIRCUIT



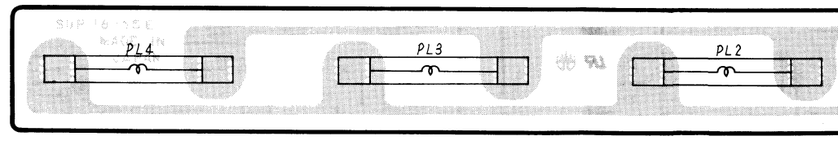
B INPUT LEVEL CONTROL



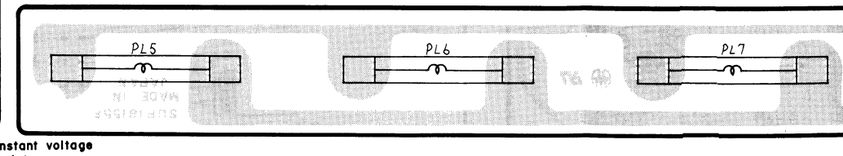
A INPUT TERMINAL CIRCUIT



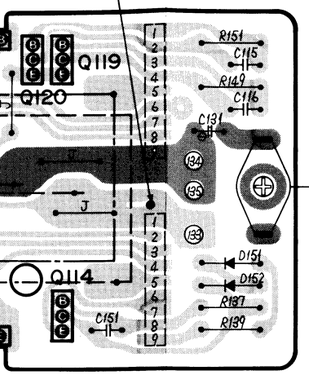
G PEAK POWER METER LAMPS

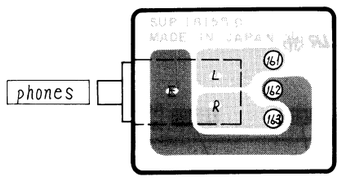


F PEAK POWER METER LAMPS

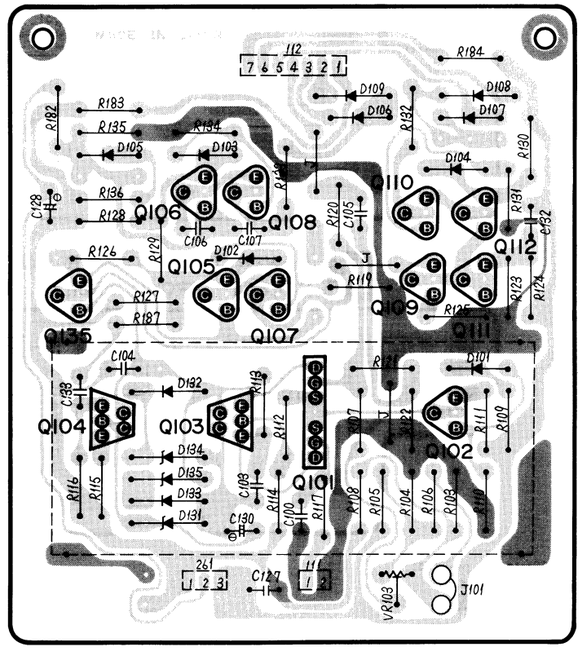


justment points of
and clamp voltage

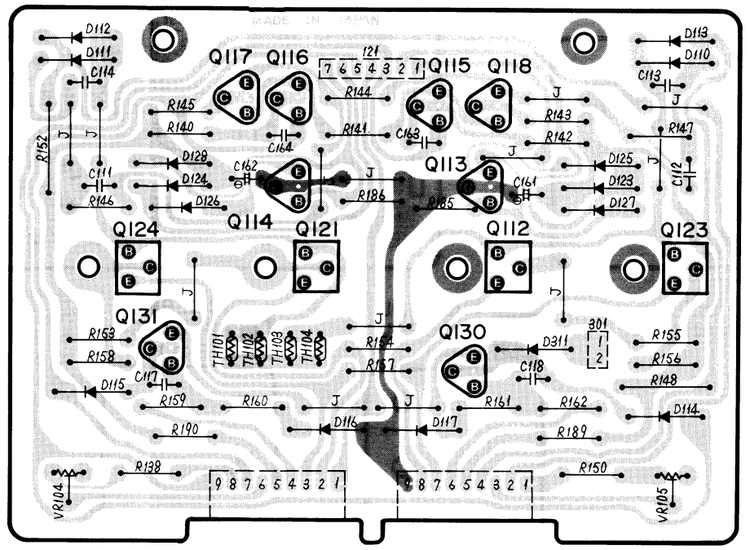




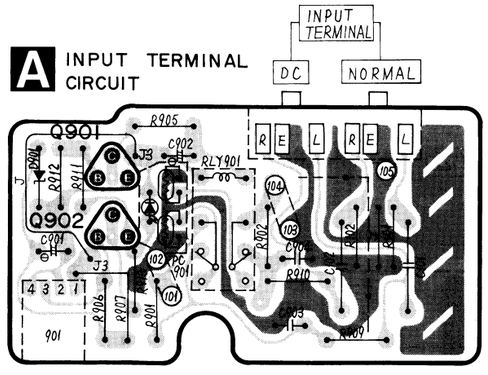
C CASCADE, CURRENT MIRROR AND DIFFERENTIAL AMP. CIRCUIT (Lch.)



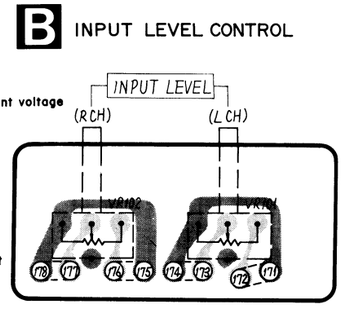
D SYNCHRONOUS BIAS CIRCUIT (Lch.)

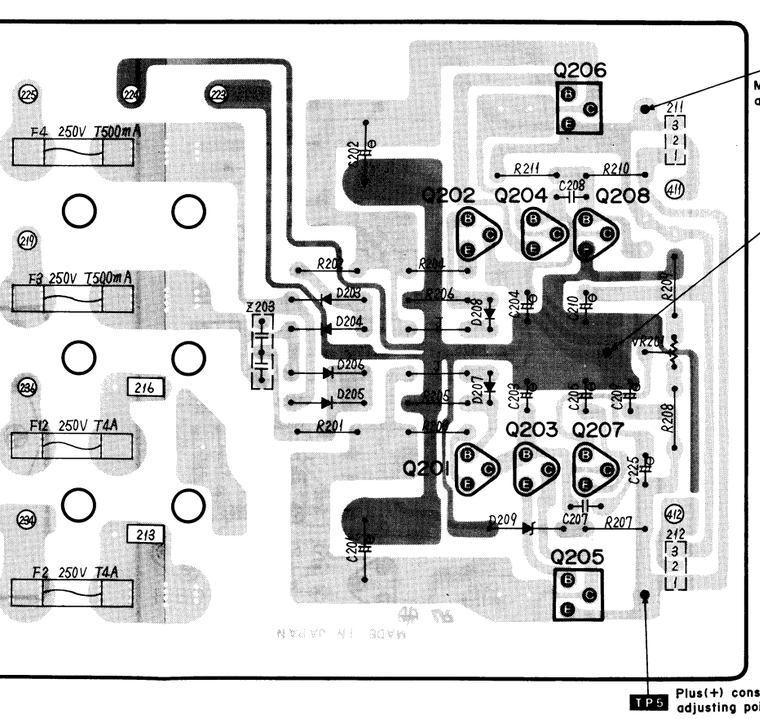


A INPUT TERMINAL CIRCUIT

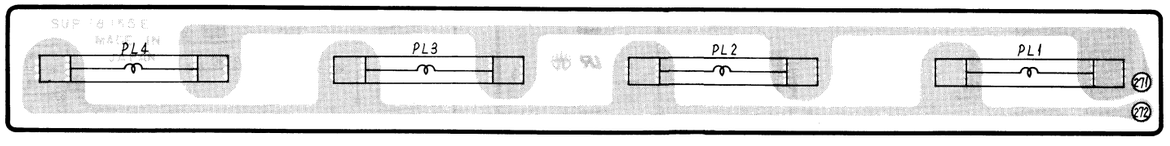


B INPUT LEVEL CONTROL

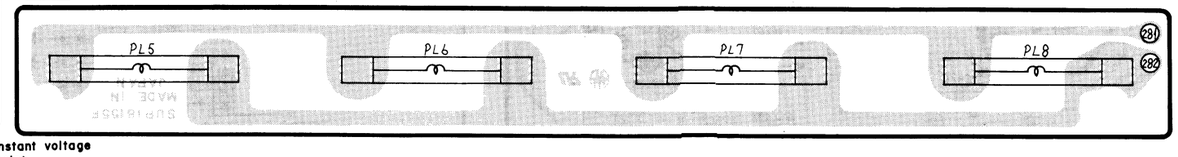




G PEAK POWER METER LAMPS

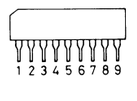


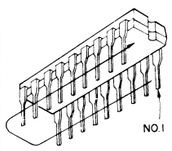
F PEAK POWER METER LAMPS



• Terminal guide of transistors, diodes and IC's

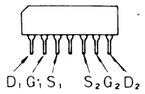
SVITA7317P
SVITA7318P





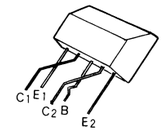
AN6552F	8pin
AN6552	8pin
MN1421STA	28pin
SVITD6250IP	16pin

SVIμPA68H



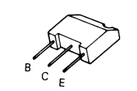
D1: Drain 1
G1: Gate 1
S1: Source 1
D2: Drain 2
G1: Gate 2
S2: Source 2

2SC2291 , 2SA995

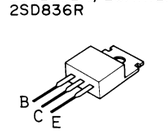


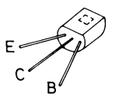
2SC1980S , 2SA722
2SA879NC , 2SC1573NC
2SC1328T , 2SA1123
2SC2631 , 2SC1885
2SA1015 , 2SA912
2SC1509 , 2SA777
2SA921 , 2SA564
2SC1685NC , 2SD788
2SC3112 , 2SC1815

2SD661 , 2SB745

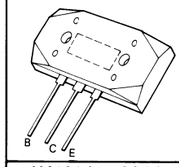


2SA913B , 2SC1913B
2SC2592R, 2SA1112R
2SD836R

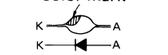




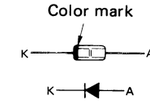
2SC3264 , 2SA1295



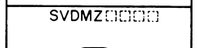
SVDMA26-1
SVDMA26-2
Color mark



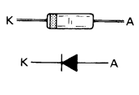
MA27WA
Color mark



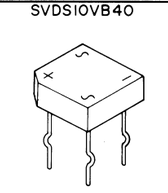
SVDMZ



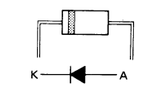
MA162A , 0A90
MA150



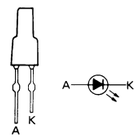
SVDS10VB40



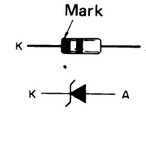
SVDSRIK2
SVDSRIK8



SVDAY5533K1M
SVDBG5533K-1



MA1120M
Mark



■ REPLACEMENT PARTS LIST (Cabinet and chassis parts)

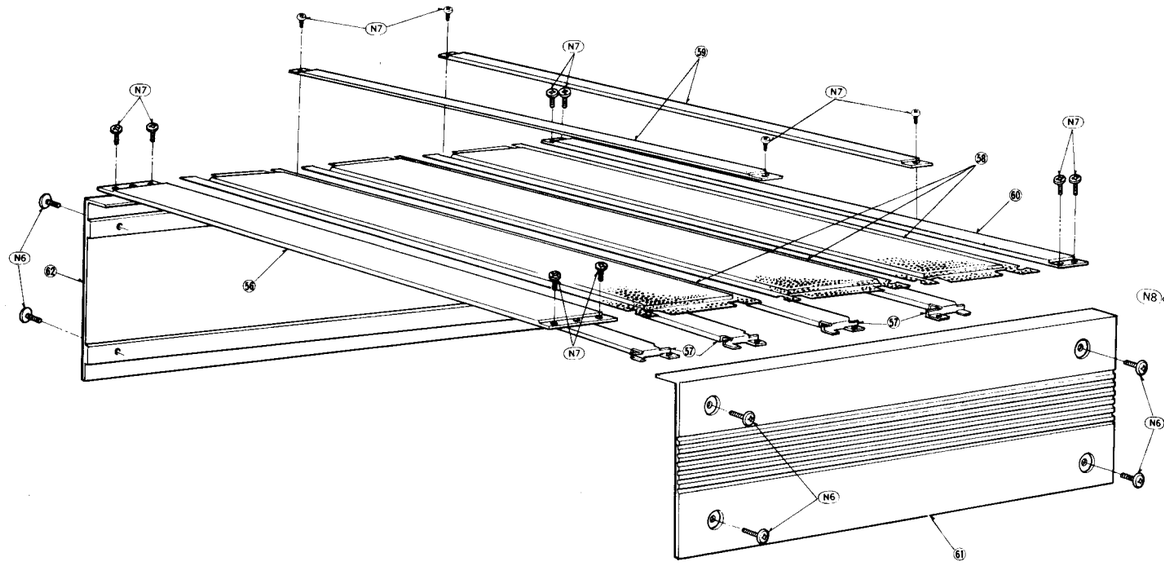
Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "**S**" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description & Pcs
CABINET and CHASSISES		
1	SGWEA3MK2N	Panel, Front Ass'y (1)
2	SDU159–4	Sheet (Orange) (1)
3	SDU159–3	Sheet (White) (2)
4	SDU159–5	Sheet (Green) (2)
5	SGU145	Glass, Front (1)
6	SHGA971	Spacer, Front Glass (5)
7	SBC261–1	Button, Power Source (1)
8	SUS193	Spring, Power Source (1)
9	SBC219–2	Button, Speaker (4)
10	SUS159	Spring, Speaker (8)
11	SHS6121	Spacer, Push Switch (3)
12	SHG6123	Spacer, Front Glass (1)
13	SGEEA3MK2N	Bracket Ass'y (with Filter) (1)
14	SDU31	Filter (Yellow) (1)
15	SDU33	Filter (Red) (4)
16	SDU41	Filter (Yellow) (4)
17	SDU39	Filter (Red) (1)
18	SHG1555–1	Holder, Lamp (5)
19	SUW1645	Holder, Lamp (1)
20	SGW2310BD	Panel, Front Bottom (1)
21	SUWEA3MK2N–1	Bracket Ass'y, Meter (1)
22	SGW2350B	Bracket (Right) (1)
23	SHGA629	Spacer, Panel (2)
24	SUW1651	Bracket (1)
25	SGW2351B	Bracket (Left) (1)
26	SUW2039	Holder, LED (1)
27	SDH545	Reflector Plate (1)
28	SMP335–1	Holder, LED (1)
29	SSM153–1	Meter (1)
30	SUW1603	Bracket, Headphone (1)
31	XCJ6P21B–A	Jack, Headphone (1)
32	SUWEA3MK2N–2	Bracket, Lamp (1)
33	SMP275	Bracket, Lamp (1)
34	SJT347	Crip, Fuse (12)
35	SUW1961–1	Bracket (4)
36	SDU35	Filter, Meter (1)
37	SKU8270	Bottom Board (1)
38	SKL239	Foot (4)
39	SUH461–1	Bracket (2)
40	SML95–1	Bracket, Power Trans. (1)
41	SUW1601	Bracket, Heat Sinker (4)
42	SUW1607	Bracket, Heat Sinker (2)

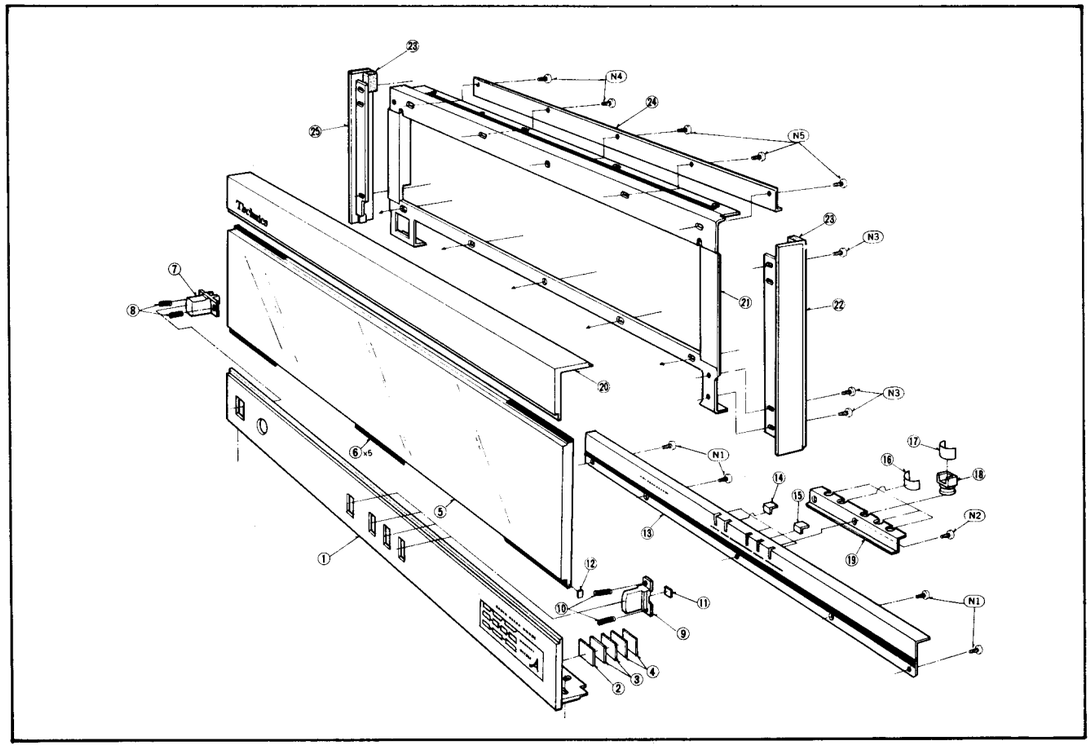
Ref. No.	Part No.	Description & Pcs
43	SUW1617	Bracket, Heat Sinker (2)
44	RHR110	Bushing (2)
45	SJF4811	Terminal Board, Output (1)
46	SJF3431A	Terminal Board, Input (1)
47	SUW1613	Bracket (1)
48[EW,XA]	SHR127	Bushing (1)
48[EK]	SHR129	Bushing (1)
48[other]	SHR131	Bushing (1)
49[EW] ⚠	SJA111	Cord, Power Source (1)
49[EK]**S** ⚠	QFC1205M	Cord, Power Source (1)
49[XA] ⚠	SJA121	Cord, Power Source (1)
49[other] ⚠	SJA123	Cord, Power Source (1)
50	SUV453	Cover, Voltage Selector (1)
51[EW,EK, XA]	SGP2151–3A	Rear Panel (1)
51[other]	SGP2151–2A	Rear Panel (1)
52	SKL241	Foot (4)
53	SBN613	Knob (2)
54	SUW1615	Bracket (1)
55	SUW1611	Bracket (2)
56	SKP75	Cabinet, Front Upper (1)
57	SUH597	Bracket (4)
58	SGM89	Bracket (3)
59	SKP81	Cabinet, Upper, Center (2)
60	SKP79	Cabinet, Upper, Rear (1)
61	SKS29	Cabinet, Right (1)
62	SKS29–1	Cabinet, Left (1)
63	SUW1619	Bracket (1)
64	SHR301	Clamper, Read Wire (5)
65[XA] only	SMX685	Cover, Capacitor (1)
SCREWS		
N1 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (4)
N2 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (1)
N3 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (6)
N4 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (2)
N5 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (3)
N6	XSSS5+12F1S	(8)
N7 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (28)
N8 **S**	XSN3+6FZS	⊕3x6 (2)

Ref. No.	Part No.	Description & Pcs
N12 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (2)
N13 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (6)
N14 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (4)
N15 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (2)
N18 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (4)
N19 **S**	XSN5+12S	⊕5x12 (4)
N22 **S**	XSN4+10FZS	⊕4x10 (4)
N24 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (8)
N25 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (5)
N26 **S**	XTB3+8BFZ	Tapping, ⊕3x8 (4)
N27 **S**	XTB4+8BFZ	Tapping, ⊕4x8 (30)
N28 **S**	XTB4+12BFZ	Tapping, ⊕4x12 (12)
N29 **S**	XTB4+12BFZ	Tapping, ⊕4x12 (4)
WASHERS		
N9 **S**	XWA3B	Spring, ϕ3 (2)
N16 **S**	XWA3B	Spring, ϕ3 (6)
N20 **S**	XWA5B	Spring, ϕ5 (4)
N23 **S**	XWA4B	Spring, ϕ4 (4)
N30 **S**	XWG5	Plain, ϕ5 (6)
N31 **S**	XWC8B	Spring with Detent, ϕ8 (2)
NUTS		
N10 **S**	XNS12	ϕ12 (1)
N11	SNE59–1	(1)
N17 **S**	XNG3BS	ϕ3 (6)
N30 **S**	XNS8	ϕ8 (2)
ACCESSORIES		
A1 [other]	SQF11773	Instruction Book (1)
A2 [XA] only	SJP9215	Cord (1)
A3	SJP2237–2	Plug (1)
PACKING PARTS		
P1 [EF]	SPG4481–1	Carton Box (1)
P1 [other]	SPG4477–1	Carton Box (1)
P2	SPS2605–2	Pad, Bottom (1)
P3	SPS2607	Pad, Upper (1)
P4	SPS2789	Pad, Rear (1)
P5	SPE349	Pad, Panel (1)
P6	SPH6279	Polyethylene Sheet (1)
P7	SPH6281	Polyethylene Sheet (1)

■ EXPLODED VIEWS



● **Front panel**



[XA] only

Power Switch (S5)

Capacitor

PL1 ~8

S5

S6

VR101

VR102

Speaker terminal P.C.B.

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

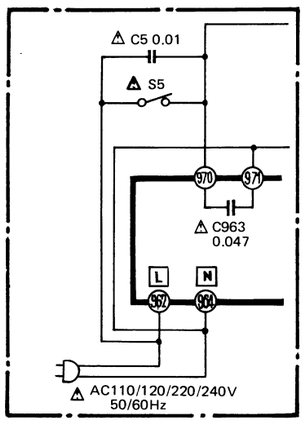
- **The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ⓞ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, pleases use the part No. in the replacement parts list.**

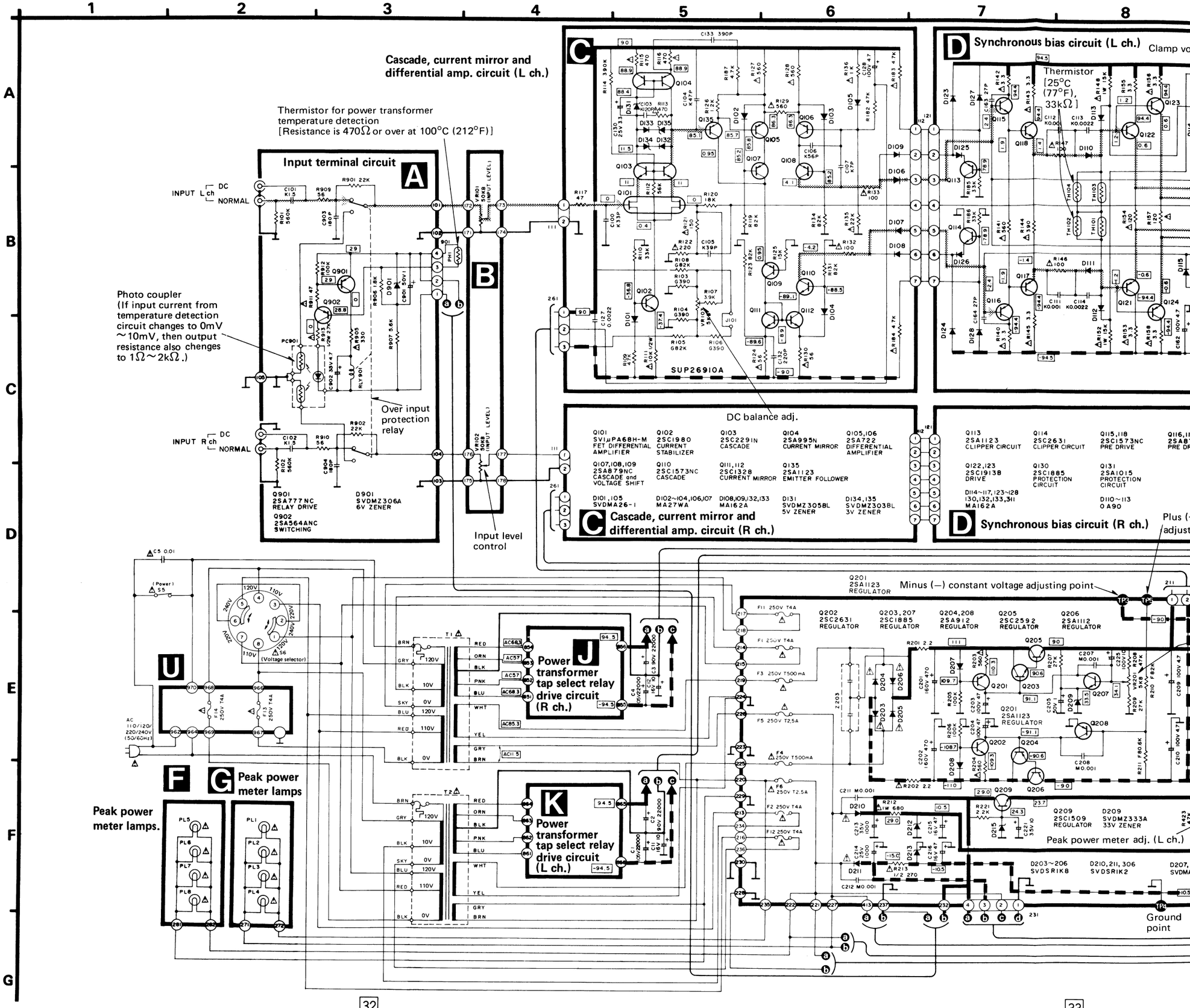
Notes

1. **S1 ~ S4:** Speaker selection switches in **"main"** position.
   S1: off, S2: main, S3: remote, S4: main and remote
2. **S5:** Power switch in **"on"** position.
3. **S6:** Voltage selector switch in **"240V"** position.
   120V ↔ 110V ↔ 220V ↔ 240V
4. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
5. ▭ indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the ground point taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester. (high tap)
6. ▒▒▒ Phono signal lines
7. ▬▬ Positive (+B) voltage lines
8. ▬▬▶ Negative (—B) voltage lines

- **Circuit to be changed**

For [EF] area





D Synchronous bias circuit (L ch.)

Clamp voltage adj.

Thermistor [25°C (77°F), 33kΩ]

ICQ adj.

E Power amplifier circuit (L ch.)

Adjustment points of ICQ and clamp voltage

SUP26930A

L Speaker selector and protection circuit

D301, 307, 351~355 MA150

D302, 303, 305 SVDSRIK2

Q301, 302, 351 2SA777 SWITCHING

Q305 2SA921 SWITCHING

Q303, 304 2SC1815 SWITCHING

Q306 2SA564 SWITCHING

D308 SVDMZ305 5V ZENER

D309 SVDMZ324 24V ZENER

L ch MAIN R ch

SPEAKERS

L ch REMOTE R ch

IC301 SVITA7317P MUTING and RELAY DRIVE

Q113 2SA1123 CLIPPER CIRCUIT

Q114 2SC2631 CLIPPER CIRCUIT

Q115,118 2SC1573NC PRE DRIVE

Q116,117 2SA879NC PRE DRIVE

Q121,124 2SA913B DRIVE

Q122,123 2SC1913B DRIVE

Q130 2SC1885 PROTECTION CIRCUIT

Q131 2SA1015 PROTECTION CIRCUIT

D110~113 0A90

D114~117, 123~128 130, 132, 133, 341 MA162A

Q120 2SB745 CLAMP VOLTAGE CONTROL

Q114, 119 2SD661 Icq adj. and CLAMP VOLTAGE CONTROL

Q125~128 2SC3264 POWER AMPLIFIER

Q135~138 2SA1295 POWER AMPLIFIER

D151, 152 MA27WA

E Power amplifier circuit (R ch.)

D Synchronous bias circuit (R ch.)

Plus (+) constant voltage adjusting poin

(+) constant voltage adjusting point

Q204, 208 2SA912 REGULATOR

Q205 2SC2592 REGULATOR

Q206 2SA1112 REGULATOR

Voltage regulator adj.

IC401, 403 SVITA7318P POWER COMPRESSOR

IC401

IC403

Thermistor [25°C (77°F), 10kΩ]

Peak power meter adj. (L ch.)

Q201 2SA1123 REGULATOR

Q209 2SC1509 REGULATOR

D209 SVDMZ333A 33V ZENER

IC402 AN6552F METER DRIVE

Peak power meter protection relay

D203~206 SVDSRIK8

D210, 211, 306 SVDSRIK2

D207, 208 SVDMA26-2

D212, 213 SVDMZ310B 10V ZENER

D215 SVDMZ324A 24V ZENER

D401~404 MA150

Ground point

Peak power meter adj. (R ch.)

Peak power meter adj. (R ch.)

H Meter amp. and regulator circuit

I

HEADPHONES

PEAK POWER METER

M Speaker selector switch circuit

(MAIN and REMOTE) S4

(REMOTE) S3

(MAIN) S2

S1 (OFF)

PL9 power

PL13 stand by /protection

PL10 main

PL12 remote

PL11 main and remote

Computer drive monitor indicators **N**

Q751, 752 2SC3112 SWITCHING

D751, 752, 754~757 SVDAY5533KIM

D753 SVDBG5533K-1

D751 : SIGNAL
D752 : THERMAL
D753 : AUTO
D754 : PREHEAT
D755 : LOW
D756 : MID
D757 : HIGH

60°C (140°F) sensor [Resistance is 770Ω or over at 60°C]

100°C (212°F) sensor [Resistance is 770Ω or over at 100°C]

130°C (266°F) sensor [Resistance is 770Ω or over at 130°C]

Temperature detection circuit (L ch.) **P**

Temperature detection circuit (R ch.) **Q**

Clock adj. (400kHz)

Clock (400kHz) adjusting point

TP701

IC701 MN1421STA ICQ CONTROLLER

IC703

IC702

Z704 (5.6K x 7)

Z703 (100K x 3)

Q705 2SC2631 SWITCHING (Icq CONTROL)

Q706

IC702,703 SVTTD6250IP INVERTER

D711 0A90

D702 SVDMZ308B 8V ZENER

Q701 2SD788 REGULATOR

D701 SVDMZ306A 6V ZENER

D703~709, 710, 712 MA150

ICQ control circuit **O**

S

D951 SVDSRIK2

T

D951 SVDSRIK2

Normal ON

D851 SVDS10VB40

D853 SVDSRIK2

J

D852 SVDS10VB40

D854 SVDSRIK2

K

Power transformer tap select relay drive circuit (R ch.)

Power transformer tap select relay drive circuit (L ch.)

Q851 2SA777NC TAP SELECT RELAY DRIVE

D855 MA1120M 12V ZENER

D856 SVDSRIK2

Q852,853 2SD836 REGULATOR

Load impedance detection (L ch.) adjusting point

Load impedance detection adj. (L ch.)

D604 SVDMZ306A 6V ZENER

Q602 2SC1685NC SWITCHING

Q603 2SA564 SWITCHING

Q604 2SD788 SWITCHING

IC601 AN6552 VOLTAGE COMPARATOR

Q601 2SC1685NC TAP SELECT RELAY DRIVE

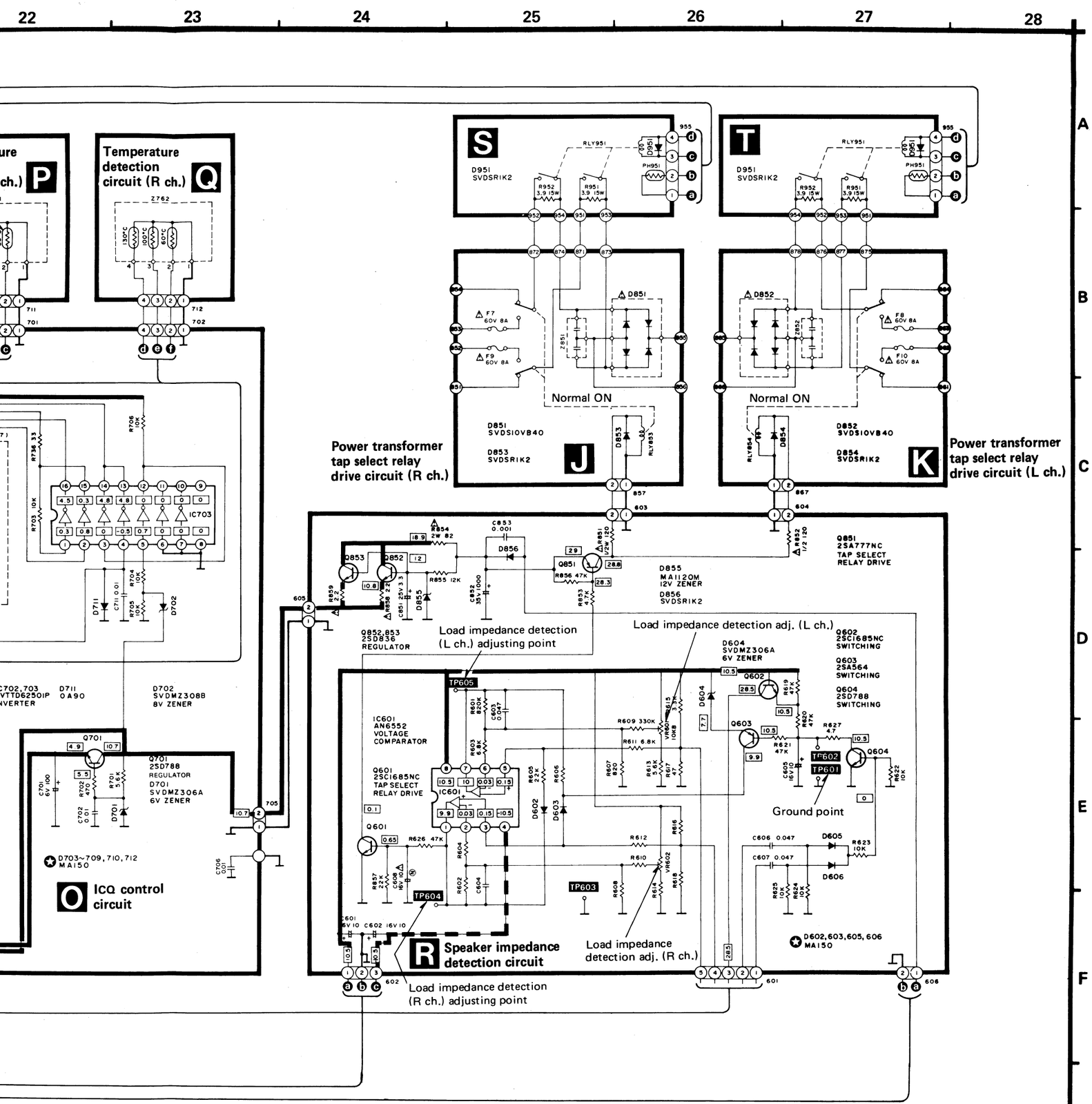
Ground point

Speaker impedance detection circuit **R**

Load impedance detection adj. (R ch.)

Load impedance detection (R ch.) adjusting point

D602, 603, 605, 606 MA150



Note

1. Transistor No. of Q135 (2SA1123) used in cascode, current mirror and differential amplifier circuit (C) and that of Q135 (2SA1295) used in power amplifier circuit (E) are overlapping. So, be careful of this point when replacing the part.
2. Transistor No. of Q114 (2SC2631) used in New Class A drive amplifier and synchronous bias circuit (D) and that of Q114 (2SD661) used in power amplifier circuit (E) are overlapping. So, be careful of this point when replacing the parts.

■ REPLACEMENT PARTS LIST (Electric parts)

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "**S**" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.		Part No.	Description
INTEGRATED CIRCUITS			
IC301		SVITA7317P	Speaker Protection
IC401,403		SVITA7318P	Log. Amp.
IC402		AN6552F	Meter Amp.
IC601		AN6552F	Voltage Comparator
IC701		MN1421STA	Micro Com.
IC702,703		SVITD62501P	Inverter
TRANSISTORS			
(Q101)x2		SVIUPA68H–LM	FET Differential Amp.
(Q102)x2	S	2SC1980–T	Constant Current
(Q103)x2	S	2SC2291–G	Cascade
(Q104)x2	S	2SA995N–G	Current Mirror
(Q105,106)x2	S	2SA722–S	Differential Amp.
(Q107~109)x2		SWV59	Cascade & Voltage Shift
(Q110)x2		SWV61	Driver
(Q111,112)x2	S	2SC1328–T	Current Mirror
(Q113,135)x2	S	2SA1123–R	Clipper Circuit & Emitter Follower
(Q114)x2	S	2SC2631–R	Clipper Circuit
(Q115,118)x2		SWV61	Pre Driver
(Q116,117)x2		SWV59	Pre Driver
(Use pair ranks as same as Q115~Q118)			
(Q114,119)x2	S	2SD661–S	ICQ Adj.
(Q120)x2	S	2SB745–S	Clamp Voltage Control
(Q121,124)x2		2SA913B–Q	Driver
(Q122,123)x2		2SC1913B–Q	Driver
(Use pair ranks as same as Q121~124)			
(Q125~128)x2		2SC3264–Y	Power
(Q135~138)x2		2SA1295–Y	Power
(Use pair ranks as same as Q125~128, Q135~138)			
(Q130)x2	S	2SC1885–R	DC Detector
(Q131)x2	S	2SA1015–Y	DC Detector
Q201	S	2SA1123–R	Regulator
Q202	S	2SC2631–R	Regulator
Q203,207	S	2SC1885–R	Regulator
Q204,208	S	2SA912–R	Regulator
Q205	S	2SC2592–R	Regulator
Q206	S	2SA1112–R	Regulator
Q209	S	2SC1509F–R	Regulator
Q301,302,351	S	2SA777NC–R	Relay Drive
Q303,304	S	2SC1815–Y	Relay Drive
Q305	S	2SA921–T	Switching
Q306	S	2SA722–S	Switching
Q601,602	S	2SC1685–Q	Tap Selector
Q603	S	2SA722–S	Switching
Q604,701		2SD788–D	Switching
Q705,706	S	2SC2631–R	ICQ Control
Q751,752		2SC3112	Switching
Q851	S	2SA777NC–R	Tap Selector
Q852,853	S	2SD836–Q	Regulator
Q901	S	2SA777NC–R	Relay Drive
Q902	S	2SA722–S	Switching

Ref. No.		Part No.	Description
DIODES			
(D101,105)x2	S	MA27A1	Bias
(D102~104)x2		MA27W–A	Bias
(D106,107)x2		MA27W–A	Bias
(D108,109)x2	S	MA162A	Detector
(D110~113)x2	S	20A90	Switching
(D114~117)x2	S	MA162A	Switching
(D123~128)x2	S	MA162A	Switching
(D131)x2		SVDMZ305BL	5V Zener
(D132,133)x2	S	MA162A	Switching
(D134,135)x2		SVDMZ303BL	3V Zener
(D151,152)x2		MA27W–A	Bias
D203~206	⚠	SVDSR1K8	Rectifier
D207,208		MA27W–A	Bias
D209		SVDMZ333A	33V Zener
D210,211,306	⚠	SVDSR1K2	Rectifier
D212,213		SVDMZ310B	10V Zener
D215		SVDMZ324A	24V Zener
D301,307, 351~355	S	MA162A	Switching
D302,303,305	⚠	SVDSR1K2	Rectifier
D308		SVDMZ305BL	5V Zener
D309		SVDMZ324	24V Zener
D311 (x2)	S	MA162A	Switching
D401~404	S	MA162A	Rectifier
D405,406	S	20A90	Switching
D602,603	S	MA162A	Switching
D604,701		SVDMZ306A	6V Zener
D605,606	S	MA162A	Rectifier
D702		SVDMZ308B	8V Zener
D703~710	S	MA162A	Detector
D711	S	20A90	Switching
D712	S	MA162A	Detector
D751,752		SVDAY5533K1M	LED, Signal, Thermal
D753		SVDBG5533K-1	LED, Auto
D754~757		SVDAY5533KIM	LED, Preheat, Low, Mid, High
D851,852	⚠	SVDS10VB40	Rectifier
D853,854		SVDSR1K2	Switching
D855		MA1120H	12V Zener
(D856,951)x2	⚠	SVDSR1K2	Rectifeir
D901		SVDMZ306A	6V Zener
THERMISTORS			
(TH101~104)x2		ERTD2ZHL333S	33kΩ
(PH1,951)x2		SRPBD47101	100°C
TH401,402		ERTD2ZHL103S	10kΩ
PHOTO INTERRUPTOR			
PC901		SVEMCD7214F	Thermal Det.

Ref. No.		Part No.	Description
FUSES			
F1,2,11,14	⚠	XBA2C40TR0	250V, T4A
F3,4	⚠	XBA2C05TR0	250V, T500mA
F5,6		XBA2C25TR0	250V, T2.5A
F7~10	⚠	XBAS4A8001	60V, 8A
COILS			
L101,102		SLQY07G–10	Choke
L955,956		ELQ050D15	Choke
TRANSFORMERS			
T1	⚠	SLT5S65–2	Power Source
T2	⚠	SLT5S65–1	Power Source
LAMPS			
PL1~PL8		XAM43P	Meter
PL9~PL13	S	XAMR48T250	Speaker Ind.
PL751~753		XAMR74S17	New Class A
VARIABLE RESISTORS			
VR101,102		EVH6UA524B54	Input Level Adj, 50kΩ (B)
VR103(x2)		EVMH8GA00B53	DC Off-set Adj, 5kΩ (B)
(VR104, 105)x2		EVMH8GA00B13	ICQ Adj, 1kΩ (B)
VR201		EVMH9GA00B53	Meter Adj, 3kΩ (B)
VR601,602		EVMH8GA00B14	Impedance Detector, 10kΩ (B)
VR701		EVMH8GA00B14	Micom VCO Adj, 10kΩ (B)
RELAYS			
RLY301		SSY109–1	Muting
RLY302,303	⚠	SSY113	Speaker Selector
RLY305		SSY83	Meter Protector
RLY853,854	⚠	SSY103–1	Tap Select
RLY901		SSY115	Input Level Select
RLY951(x2)	⚠	SSY103–1	Tap Select
SWITCHES			
S1~4		SSH457	Speaker Selector
S5 [XA].	⚠	ESB9997S	Power Source
S5 [other]	⚠	ESB99399S	Power Source
S6	⚠	ESE37200	Voltage Selector
COMPONENT COMBINATIONS			
Z203		SXRFS203ZSM	0.01μFx2
Z703		EXBP83104M	100kΩx4
Z704		EXBP87562K	5.6kΩx7
Z761,762		SXRPTH517F03	60°C, 100°C, 130°C Sensor
Z851,852		SXRFS203ZSM	0.01μFx2

NOTE

- Transistors (Q107~110, Q115~118) are provided with radiating fins when supplied.

Circuit diagram No.	Transistor	Repair part No.
Q110, 115, 118 (Same on both Rch. and Lch.)	2SC1573NC	SWV61
Q107,108,109, 116, 117 (Same on both Rch. and Lch.)	2SA879NC	SWV59

■ RESISTORS & CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "**S**" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns spedify the area. Parts without these indications can be used for all areas.

Resistor Type	Wattage	Tolerance
ERD : Carbon	14 : 1/4W	J : ±5%
ERG : Metal Oxide	25 : 1/4W	G : ±2%
ERO : Metal Film	26 : 1/4W	K : ±10%
ERX : Metal Film	1 : 1W	
ERC : Solid	1A : 1W	
ERF : Non-flammable	2A : 2W	
	3A : 3W	

Capacitor Type	Voltage: ECEA Type	Voltage: Other	Tolerance
ECEA : Electrolytic	1A : 10V	1H : 50V	C : ±0.25pF
ECCD : Ceramic	1C : 16V	KC : 400V AC	D : ±0.5pF
ECKD : Ceramic	1E : 25V	2H : 500V DC	M : ±20%
ECQM : Polyester	1H : 50V	2A : 250V AC	J : ±5%
ECET : Electrolytic	1J : 63V	2C : 160V DC	K : ±10%
ECEA..... N: Non Polar Electrolytic	1V : 35V		Z : +80%, −20%
ECQE : Polyester	50 : 50V		P : +100%, −0%
	25 : 25V		
	2A : 100V		

Ref. No.		Part No.	Value
RESISTORS			
R101,102		ERO25CKF5603	560K
R103,104 (x2)	S	ERO25CKF3900	390
R105 (x2)	S	ERO25CKF8202	82K
R106 (x2)	S	ERO25CKF3900	390
R107 (x2)	S	ERO25CKF3900	390
R108 (x2)	S	ERO25CKF8202	82K
R109 (x2)	S	ERO25CKF4702	47K
R110 (x2)	S	ERO25CKF3302	33K
R111 (x2)⚠S		ERDS1FJ103	10K
R112 (x2)	S	ERO25CKF5602	56K
R113	⚠S	ERD25FJ471	470
R114		ERO25CKF3903	390K
R115,116 ⚠S (x2)		ERD25FJ471	470
R117 (x2)		ERO25CKF47R0	47
R119 (x2)	S	ERO25CKF8202	82K
R120 (x2)	S	ERO25CKF1802	18K
R121 (x2)⚠S		ERD25FJ151	150
R122 (x2)⚠S		ERD25FJ221	220
R123 (x2)	S	ERO25CKF8202	82K
R124 (x2)⚠S		ERD25FJ560	56
R125 (x2)	S	ERO25CKF1502	15K
R126 (x2)		ERO25CKF1201	1.2K
R127,128 ⚠S (x2)		ERD25FJ561	560
R129 (x2)⚠S		ERD25FJ561	560
R130 (x2)⚠S		ERD25FJ560	56
R131 (x2)	S	ERO25CKF8202	82K
R132,133 ⚠S (x2)		ERD25FJ101	100
R134 (x2)	S	ERO25CKF8202	82K
R135 (x2)⚠S		ERD25FJ223	22K
R136 (x2)⚠S		ERD25FJ102	1K
R137 (x2)⚠S		ERD25FJ272	2.7K
R138 (x2)⚠S		ERD25FJ821	820
R139 (x2)⚠S		ERD25FJ100	10
R140 (x2)⚠S		ERD25FJ3R3	3.3
R141 (x2)⚠		ERD2FCG561	560
R142,143 ⚠S (x2)		ERD25FJ3R3	3.3
R144 (x2)⚠		ERD2FCG391	390
R145 (x2)⚠S		ERD25FJ3R3	3.3
R146,147 ⚠ (x2)		ERD2FCG101	100
R148 (x2)	S	ERG1ANJ153	15K
R149 (x2)	S	ERO25CKF1741	1.74K
R150 (x2)⚠S		ERD25FJ392	3.9
R151 (x2)	S	ERO25CKF1741	1.74K
R152 (x2)	S	ERG1ANJ153	15K
R153 (x2)⚠S		ERD25FJ3R3	3.3
R154 (x2)⚠		ERD2FCG121	120
R155,156 ⚠S (x2)		ERD25FJ3R3	3.3
R157 (x2)⚠		ERD2FCG121	120
R158 (x2)⚠S		ERD25FJ3R3	3.3
R159 (x2)⚠S		ERD25FJ222	2.2K
R160,161 (x2)	S	ERO25CKF2202	22K
R162 (x2)⚠S		ERD25FJ222	22K
R163,164 (x2)		ERF5RKR33	0.33
R165,166 (x2)		ERF5RKR33	0.33
R167,168 (x2)		ERF5RKR33	0.33
R169,170 (x2)		ERF5RKR33	0.33
R171,172	S	ERG3ANJ100	10
R173,174	S	ERX3ANJ5R6	5.6
R175,176	S	ERG3ANJ331	330
R182 (x2)	S	ERO25CKF4702	47K
R183,184 ⚠S (x2)		ERD25FJ472	4.7K
R185,186 (x2)	S	ERO25CKF3302	33K
R187 (x2)⚠S		ERD25FJ472	4.7K
R189,190 ⚠ (x2)		ERD25FJ2R2	
R191,192 ⚠ (x2)		ERD25FJ2R2	2.2
R193,194 ⚠S (x2)		ERD25FJ2R2	2.2
R195,196 ⚠S (x2)		ERD25FJ2R2	2.2
R197,198 ⚠S (x2)		ERD25FJ2R2	2.2
R201,202 ⚠S		ERD25FAJ2R2	2.2
R203,204 ⚠S		ERD25FJ561	560
R205,206	S	ERO25CKF1003	100K
R207	S	ERO25CKF2702	27K
R208	S	ERO25CKF4702	47K
R209		ERO25CKF2702	27K
R210	S	ERO25CKF8202	82K
R211		ERO25CKF8062	80.6K
R212	S	ERG1ANJ681	680
R213	⚠	ERDS1FJ271	270
R214	⚠S	ERD25FJ471	470
R216	⚠S	ERD25FJ471	470
R221		ERO25CKF2201	2.2K
R301,302	S	ERO25CKF6802	68K
R303,304		ERO25CKF2202	22K
R305		ERO25CKF3901	3.9K
R307	S	ERO25CKF5602	56K
R308	S	ERO25CKF1202	12K
R309		ERO25CKF3901	3.9K
R310	S	ERO25CKF5601	5.6K
R311	S	ERO25CKF8201	8.2K
R312		ERO25CKF8202	82K
R313	S	ERO25CKF5601	5.6K
R314	S	ERO25CKF1802	18K
R315,316 ⚠S		ERDS1FJ121	120
R318	⚠S	ERDS1FJ121	120
R319	⚠S	ERDS1FJ271	270
R320	S	ERO25CKF5601	5.6K
R321	S	ERO25CKF1002	10K
R325	S	ERO25CKF1002	10K
R326	S	ERO25CKF1003	100K
R327	S	ERO25CKF4702	47K
R331,332	S	ERO25CKF1003	100K
R351		ERO25CKF8201	8.2K
R352		ERO25CKF1001	1K
R353,354 ⚠		ERDS1FJ121	120
R356	⚠	ERDS1FJ392	3.9K
R401,402	S	ERO25CKF1003	100K
R403,404	S	ERO25CKF2702	27K
R405,406 ⚠S		ERC14GK165	1.6M
R407,408 ⚠S		ERC14GK165	1.6M
R409,410	S	ERO25CKF1001	1K
R411,412	S	ERO25CKF4701	4.7K
R413,414	S	ERO25CKF1002	10K
R415,416	S	ERO25CKF3901	3.9K
R417,418	S	ERO25CKF1003	100K
R419,420	S	ERO25CKF4700	470
R421,422		ERO25CKF4701	4.7K
R423,424		ERO26CKF4701	4.7K
R425,426	S	ERO25CKF6801	6.8K
R601,602	S	ERD25TJ824	820K
R603,604	S	ERD25FJ682	6.8K
R605,606	S	ERD25TJ223	22K
R607,608	S	ERD25FJ821	820
R609,610	S	ERD25TJ334	330K
R611,612	S	ERD25FJ682	6.8K
R613,614	S	ERD25FJ562	5.6K
R615,616	S	ERD25FJ332	3.3K
R617,618	S	ERD25FJ470	47
R619,620	S	ERD25TJ473	47K
R621	S	ERD25TJ473	47K
R622,623	S	ERD25FJ103	10K
R624,625	S	ERD25FJ103	10K
R626	S	ERD25TJ473	47K
R627	S	ERD25FJ4R7	4.7
R701	S	ERD25FJ562	5.6K
R702	S	ERD25FJ471	470
R703,704	S	ERD25FJ103	10K
R705,706	S	ERD25FJ103	10K
R707,708	S	ERD25FJ472	4.7K
R709,710	S	ERD25FJ472	4.7K
R711,712	S	ERD25FJ472	4.7K
R713,714	S	ERD25TJ333	33K
R715,716	S	ERD25TJ123	12K
R717,718	S	ERD25TJ183	18K
R719,720	S	ERD25TJ333	33K
R721,722	S	ERD25TJ273	27K
R723,724	S	ERD25TJ273	27K
R725,726	S	ERD25FJ562	5.6K
R727,728	S	ERD25FJ222	2.2K
R729,730	S	ERD25FJ103	10K
R733,734	S	ERD25FJ103	10K
R735	S	ERD25FJ332	3.3K
R736	S	ERD25FJ330	33
R737,738	S	ERD25TJ333	33K
R739,740	S	ERD25TJ333	33K
R751,752	S	ERD25FJ121	120
R753	S	ERD25FJ121	120
R754,755	S	ERD25FJ101	100
R756	S	ERD25FJ332	3.3K
R757	S	ERD25FJ150	15
R851,852 ⚠S		ERDS1FJ121	120
R853	S	ERD25FJ472	4.7K
R854	S	ERG2ANJ820	82
R855	S	ERD25TJ123	12K
R856	S	ERD25TJ473	47K
R857	S	ERD25TJ223	22K
R858,859 ⚠S		ERD25FJ2R2	2.2
R901,902	S	ERD25TJ223	22K
R905 ⚠S		ERD25FJ331	330
R906	S	ERD25FJ182	1.8K
R907	S	ERD25FJ562	5.6K
R909,910	S	ERD25FJ560	56
R911 ⚠S		ERD25FJ470	47
R912	S	ERD25TJ104	100K
R913 ⚠S		ERDS1FJ272	2.7K
R951,952 (x2)		ERF15ZXK 3R9B	

■ RESISTORS & CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "**S**" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns spedify the area. Parts without these indications can be used for all areas.

Resistor Type	Wattage	Tolerance
ERD : Carbon	14 : 1/4W	J : ± 5%
ERG : Metal Oxide	25 : 1/4W	G : ±2%
ERO : Metal Film	26 : 1/4W	K : ±10%
ERX : Metal Film	1 : 1W	
ERC : Solid	1A : 1W	
ERF : Non-flammable	2A : 2W	
	3A : 3W	

Capacitor Type	Voltage: ECEA Type	Voltage: Other	Tolerance
ECEA : Electrolytic	1A : 10V	1H : 50V	C : ± 0.25pF
ECCD : Ceramic	1C : 16V	KC : 400V AC	D : ±0.5pF
ECKD : Ceramic	1E : 25V	2H : 500V DC	M : ± 20%
ECQM : Polyester	1H : 50V	2A : 250V AC	J : ± 5%
ECET : Electrolytic	1J : 63V	2C : 160V DC	K : ± 10%
ECEA..... N: Non Polar Electrolytic	1V : 35V		Z : +80%, −20%
ECQE : Polyester	50 : 50V		P : +100%, −0%
	25 : 25V		
	2A : 100V		

Ref. No.		Part No.	Value
RESISTORS			
R101,102		ERO25CKF5603	560K
R103,104 (x2)	S	ERO25CKF3900	390
R105 (x2)	S	ERO25CKF8202	82K
R106 (x2)	S	ERO25CKF3900	390
R107 (x2)	S	ERO25CKF3900	390
R108 (x2)	S	ERO25CKF8202	82K
R109 (x2)	S	ERO25CKF4702	47K
R110 (x2)	S	ERO25CKF3302	33K
R111 (x2) ⚠S		ERDS1FJ103	10K
R112 (x2)	S	ERO25CKF5602	56K
R113 ⚠S		ERD25FJ471	470
R114		ERO25CKF3903	390K
R115,116 ⚠S (x2)		ERD25FJ471	470
R117 (x2)		ERO25CKF47R0	47
R119 (x2)	S	ERO25CKF8202	82K
R120 (x2)	S	ERO25CKF1802	18K
R121 (x2) ⚠S		ERD25FJ151	150
R122 (x2) ⚠S		ERD25FJ221	220
R123 (x2)	S	ERO25CKF8202	82K
R124 (x2) ⚠S		ERD25FJ560	56
R125 (x2)	S	ERO25CKF1502	15K
R126 (x2)		ERO25CKF1201	1.2K
R127,128 ⚠S (x2)		ERD25FJ561	560
R129 (x2) ⚠S		ERD25FJ561	560
R130 (x2) ⚠S		ERD25FJ560	56
R131 (x2)	S	ERO25CKF8202	82K
R132,133 ⚠S (x2)		ERD25FJ101	100
R134 (x2)	S	ERO25CKF8202	82K
R135 (x2) ⚠S		ERD25FJ223	22K
R136 (x2) ⚠S		ERD25FJ102	1K
R137 (x2) ⚠S		ERD25FJ272	2.7K
R138 (x2) ⚠S		ERD25FJ821	820
R139 (x2) ⚠S		ERD25FJ100	10
R140 (x2) ⚠S		ERD25FJ3R3	3.3
R141 (x2) ⚠		ERD2FCG561	560
R142,143 ⚠S (x2)		ERD25FJ3R3	3.3
R144 (x2) ⚠		ERD2FCG391	390
R145 (x2) ⚠S		ERD25FJ3R3	3.3
R146,147 ⚠ (x2)		ERD2FCG101	100
R148 (x2)	S	ERG1ANJ153	15K
R149 (x2)	S	ERO25CKF1741	1.74K
R150 (x2) ⚠S		ERD25FJ392	3.9
R151 (x2)	S	ERO25CKF1741	1.74K
R152 (x2)	S	ERG1ANJ153	15K
R153 (x2) ⚠S		ERD25FJ3R3	3.3
R154 (x2) ⚠		ERD2FCG121	120
R155,156 ⚠S (x2)		ERD25FJ3R3	3.3
R157 (x2) ⚠		ERD2FCG121	120
R158 (x2) ⚠S		ERD25FJ3R3	3.3
R159 (x2) ⚠S		ERD25FJ222	2.2K
R160,161 (x2)	S	ERO25CKF2202	22K
R162 (x2) ⚠S		ERD25FJ222	22K
R163,164 (x2)		ERF5RKR33	0.33
R165,166 (x2)		ERF5RKR33	0.33
R167,168 (x2)		ERF5RKR33	0.33
R169,170 (x2)		ERF5RKR33	0.33
R171,172	S	ERG3ANJ100	10
R173,174	S	ERX3ANJ5R6	5.6
R175,176	S	ERG3ANJ331	330
R182 (x2)	S	ERO25CKF4702	47K
R183,184 ⚠S (x2)		ERD25FJ472	4.7K
R185,186 (x2)	S	ERO25CKF3302	33K
R187 (x2) ⚠S		ERD25FJ472	4.7K
R189,190 ⚠ (x2)		ERD25FJ2R2	
R191,192 ⚠ (x2)		ERD25FJ2R2	2.2
R193,194 ⚠S (x2)		ERD25FJ2R2	2.2
R195,196 ⚠S (x2)		ERD25FJ2R2	2.2
R197,198 ⚠S (x2)		ERD25FJ2R2	2.2
R201,202 ⚠S		ERD25FAJ2R2	2.2
R203,204 ⚠S		ERD25FJ561	560
R205,206	S	ERO25CKF1003	100K
R207	S	ERO25CKF2702	27K
R208	S	ERO25CKF4702	47K
R209		ERO25CKF2702	27K
R210	S	ERO25CKF8202	82K
R211		ERO25CKF8062	80.6K
R212	S	ERG1ANJ681	680
R213 ⚠		ERDS1FJ271	270
R214 ⚠S		ERD25FJ471	470
R216 ⚠S		ERD25FJ471	470
R221		ERO25CKF2201	2.2K
R301,302	S	ERO25CKF6802	68K
R303,304		ERO25CKF2202	22K
R305		ERO25CKF3901	3.9K
R307	S	ERO25CKF5602	56K
R308	S	ERO25CKF1202	12K
R309		ERO25CKF3901	3.9K
R310	S	ERO25CKF5601	5.6K
R311	S	ERO25CKF8201	8.2K
R312		ERO25CKF8202	82K
R313	S	ERO25CKF5601	5.6K
R314	S	ERO25CKF1802	18K
R315,316 ⚠S		ERDS1FJ121	120
R318 ⚠S		ERDS1FJ121	120
R319 ⚠S		ERDS1FJ271	270
R320	S	ERO25CKF5601	5.6K
R321	S	ERO25CKF1002	10K
R325	S	ERO25CKF1002	10K
R326	S	ERO25CKF1003	100K
R327	S	ERO25CKF4702	47K
R331,332	S	ERO25CKF1003	100K
R351		ERO25CKF8201	8.2K
R352		ERO25CKF1001	1K
R353,354 ⚠		ERDS1FJ121	120
R356 ⚠		ERDS1FJ392	3.9K
R401,402	S	ERO25CKF1003	100K
R403,404	S	ERO25CKF2702	27K
R405,406 ⚠S		ERC14GK165	1.6M
R407,408 ⚠S		ERC14GK165	1.6M
R409,410	S	ERO25CKF1001	1K
R411,412	S	ERO25CKF4701	4.7K
R413,414	S	ERO25CKF1002	10K
R415,416	S	ERO25CKF3901	3.9K
R417,418	S	ERO25CKF1003	100K
R419,420	S	ERO25CKF4700	470
R421,422		ERO25CKF4701	4.7K
R423,424		ERO25CKF4701	4.7K
R425,426	S	ERO25CKF6801	6.8K
R601,602	S	ERD25TJ824	820K
R603,604	S	ERD25FJ682	6.8K
R605,606	S	ERD25TJ223	22K
R607,608	S	ERD25FJ821	820
R609,610	S	ERD25TJ334	330K
R611,612	S	ERD25FJ682	6.8K
R613,614	S	ERD25FJ562	5.6K
R615,616	S	ERD25FJ332	3.3K
R617,618	S	ERD25FJ470	47
R619,620	S	ERD25TJ473	47K
R621	S	ERD25TJ473	47K
R622,623	S	ERD25FJ103	10K
R624,625	S	ERD25FJ103	10K
R626	S	ERD25TJ473	47K
R627	S	ERD25FJ4R7	4.7
R701	S	ERD25FJ562	5.6K
R702	S	ERD25FJ471	470
R703,704	S	ERD25FJ103	10K
R705,706	S	ERD25FJ103	10K
R707,708	S	ERD25FJ472	4.7K
R709,710	S	ERD25FJ472	4.7K
R711,712	S	ERD25FJ472	4.7K
R713,714	S	ERD25TJ333	33K
R715,716	S	ERD25TJ123	12K
R717,718	S	ERD25TJ183	18K
R719,720	S	ERD25TJ333	33K
R721,722	S	ERD25TJ273	27K
R723,724	S	ERD25TJ273	27K
R725,726	S	ERD25FJ562	5.6K
R727,728	S	ERD25FJ222	2.2K
R729,730	S	ERD25FJ103	10K
R733,734	S	ERD25FJ103	10K
R735	S	ERD25FJ332	3.3K
R736	S	ERD25FJ330	33
R737,738	S	ERD25TJ333	33K
R739,740	S	ERD25TJ333	33K
R751,752	S	ERD25FJ121	120
R753	S	ERD25FJ121	120
R754,755	S	ERD25FJ101	100
R756	S	ERD25FJ332	3.3K
R757	S	ERD25FJ150	15
R851,852 ⚠S		ERDS1FJ121	120
R853	S	ERD25FJ472	4.7K
R854	S	ERG2ANJ820	82
R855	S	ERD25TJ123	12K
R856	S	ERD25TJ473	47K
R857	S	ERD25TJ223	22K
R858,859 ⚠S		ERD25FJ2R2	2.2
R901,902	S	ERD25TJ223	22K
R905 ⚠S		ERD25FJ331	330
R906	S	ERD25FJ182	1.8K
R907	S	ERD25FJ562	5.6K
R909,910	S	ERD25FJ560	56
R911 ⚠S		ERD25FJ470	47
R912	S	ERD25TJ104	100K
R913 ⚠S		ERDS1FJ272	2.7K
R951,952 (x2)		ERF15ZXK 3R9B	

Ref. No.		Part No.	Value
CAPACITORS			
C1 ~ 4 ⚠		ECEGL2AR223X	22000
C5 ⚠		ECKDKC103PF	0.01
C11, 12		ECEAICS100	10
C100 (x2)	S	ECCD1H330K	33P
C101,102		ECQE1155KZ	1.5
C103 (x2)	S	ECCD1H121K	120P
C104 (x2)	S	ECCD1H470K	47P
C105 (x2)	S	ECCD1H390K	39P
C106 (x2)	S	ECCD1H560K	56P
C107 (x2)	S	ECCD1H070CC	7P
C111,112 (x2)	S	ECQM1H102JZ	0.001
C113,114 (x2)	S	ECQM1H222JZ	0.0022
C115,116 (x2)	S	ECKD1H102MD	0.001
C117,118 (x2)	S	ECKD1H471KB	470P
C119,120	S	ECQM1H683JZ	0.068
C121,122	S	ECQM1H683JZ	0.068
C127 (x2)		ECKD2H222KB	0.0022
C128 (x2)	S	ECEA2AS4R7	4.7
C130 (x2)	S	ECEA50Z3R3	3.3
C131 (x2)	S	ECEA50Z1	1
C132 (x2)	S	ECKD1H221KB	220P
C133 (x2)	S	ECKD1H391KB	390P
C151 (x2)	S	ECKD1H102MD	0.001
C161,162 (x2)	S	ECEA2AS4R7	4.7
C163,164 (x2)	S	ECCD1H270K	27P
C201,202		ECET2CR471SL	470
C203,204	S	ECEA2AS470	47
C205	S	ECEA50Z1	1
C207,208	S	ECKD1H102ZF	0.001
C209,210	S	ECEA2AS4R7	4.7
C211,212	S	ECKD1H102ZF	0.001
C213	S	ECEA1VS102	1000
C214	S	ECEA1VS102	1000
C215,216	S	ECEA1ES470	47
C217,218	S	ECEA1ES221	220
C221	S	ECEA1HS100	10
C225	S	ECEA2AS100	10
C301,302 ⚠S		ECEA1CN101S	100
C303	S	ECEA50Z1	1
C304	S	ECEA50Z3R3	3.3
C305	S	ECKD1H102ZF	0.001
C310	S	ECEA1VS330	33
C311	S	ECEA1HS470	47
C320	S	ECEA1VS330	33
C321	S	ECKD1H103ZF	0.01
C351	S	ECEA1VS100	10
C401,402 ⚠S		ECEA1HN3R3S	3.3
C403,404	S	ECQM1H104JZ	0.1
C405	S	ECEA50ZR47	0.47
C407,408	S	ECKD1H221KB	220P
C411,412		ECQP1822FZ	0.0082
C415	S	ECEA50ZR47	0.47
C601,602	S	ECEA1HS100	10
C603,604	S	ECQM1H473JZ	0.047
C605	S	ECEA1HS100	10
C606,607	S	ECQM1H473JZ	0.047
C608 ⚠S		ECEA1CN100S	10
C701	S	ECEA1AS101	100
C702	S	ECKD1H103ZF	0.01
C703,704	S	ECEA50Z3R3	3.3
C705	S	ECKD1H271KB	270P
C706	S	ECKD1H103ZF	0.01
C707	S	ECEA50ZR47	0.47
C708	S	ECKD1H103ZF	0.01
C710,711	S	ECKD1H103ZF	0.01
C712	S	ECEA1AS101	100
C751	S	ECKD1H102ZF	0.001
C851	S	ECEA50Z3R3	3.3
C852	S	ECEB1VS102	1000
C853	S	ECKD1H102ZF	0.001
C901	S	ECEA50Z1	1
C902	S	ECEA1JS4R7	4.7
C903,904	S	ECCD1H181K	180P

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